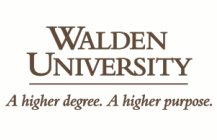

2016

The Relationship Between Increased Police Patrols and Violent Crime Rates in Seven United States Cities

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This is to certify that the doctoral dissertation by

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has been found to be complete and satisfactory in all respects,
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Walden University
2016

Abstract

The Relationship Between Increased Police Patrols and Violent Crime Rates in Seven United States Cities

by

Victor Sylvester Kabia

MALS, Georgetown University, 2005

BA Hon., Fourah Bay College, University of Sierra Leone, 1981

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Public Policy and Administration

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Abstract

Large, metropolitan areas across the nation have experienced high rates of violent crime over the past 2 decades. As a consequence, law enforcement agencies have increased patrol efforts, but little is known about whether the decrease in violent crime rates was correlated to increased police patrols or to the economic variables of unemployment, inflation, level of education, unemployment compensation, and homeownership. The purpose of this non-experimental, correlational study was to examine the nature of the relationship between increased police patrols, the 5 economic variables, and violent crime rates in 7 large US cities for a 10-year period. The theoretical framework for this study was based on Paternoster's deterrence theory and Becker's economic theory of crime causation. Data were acquired from the Federal Bureau of Investigation and used a sample of 114 cases of reported violent crimes for each city included in the study for the years 2000 – 2010 (n = 798). A multiple regression analysis was initially performed with inconclusive results. Spearman's correlations between each of the independent and dependent variables of violent crime indicated that all the independent variables except for homeownership had statistically significant inverse correlations with violent crime rates. The findings of this study may be used by law enforcement agencies and policy makers to develop crime prevention interventions that address those economic factors associated with violent crime, thereby promoting positive social change through creating safer communities.

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Dedication

I dedicate this dissertation with affection to my father, mother, and all my teachers and dedicated friends who by their interest and encouragement have continually inspired me.

Acknowledgments

I am grateful to Dr. Hilda Shepeard, Dr. Stallo, and Dr. Settles, my dissertation committee for their invaluable guidance and all my tutors at Walden University who in various ways have brought me to this desired point of my quest.

In the same vein, I wish to thank Alex Naron, my computer mentor, and Carolyn Suitt, the indomitable cheerleader, who cheered me to the end. To my numerous friends at the Center for Information Technology (CIT), Andy, Francini, Harry, Bill, Peter, Aloba, Edward, Agnes, Caponitti, and all my colleagues at MVM and many others for their encouragement.

To my family, Marie, Hannah, Samuel R. Kabia, Victoria, John, Sentho, Sinnah, Gbessay, Ya Marie, Bafia, Baby Abu, Potho, Lombeh, Cecilia, Tutu, Fatmata, and Namina, I say “Thank You” for believing in me.

To my YUSA family, Samuel B. Koroma, Ibrahim Kamara, Sallu Fullah, Musa Bangura, Sallieu Kamara, Beatrice Conteh, Beatrice Mulwanda, Abdul Kamara, etc., thank you for your encouragement.

Finally, I thank all my sons-in- law, Abdul Rahman Kargbo, Idrissa Sesay, Desmond, and all those related to this family in one way or the other.

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Chapter 1: Introduction

The plague of violent crime in Washington, DC; Indianapolis, IN; Philadelphia, PA; Boston, MA; Kansas City, MO; Los Angeles, CA; and Pittsburgh, PA has caused a large deal of human misery as people have lost loved ones in the spate of violence. Systematic, scientifically-based research focuses efforts to reduce uncertainty and increase efficacy regarding problems, such as the rate of violent crime (Knoke, Bohrnstedt, & Mee, 2002).

Background

One of the defining features of American democracy is the opportunity for free and open debate on critical public policies, such as the best strategy for reducing or preventing violent crime (Akesson et al., 2012). The debate regarding the prevention of crime, including violent crime, is based on the ideologies of the major political parties, Democrats and Republicans, or liberals and conservatives, respectively. The existence of a strong social support system is one of the cornerstones of liberal politics, whereas conservative ideology relies on the widespread institution of police agents and deterrence (Akesson et al., 2012).

Akesson et al. (2012) asserted that conservatives are critical of liberals for the failed policies in controlling crimes. Wilson (1975) openly criticized "the liberal bankruptcy" of the liberal social support policies, including the liberals' policies in the 1960s and 1970s that failed to decrease or prevent crime in the United States, and concluded that their policies had no relationship with crime (Ren, L., Zhao, J., and

Lovrich, N. P. 1990 p.316). The liberals fought back 10 years later and retorted that conservative policies had not been successful in reducing or preventing crime either (Currie, 1985). This study helped to fill the gap in the literature regarding how the outcomes of existing empirical studies could be related to other cities not included in previous meta-analyses (Gill, Weisburd, Telep, Vitter, & Bennett, 2014; Hoelzer & Gorman, 2011; Philadelphia Foot Patrol Experiment, 2009). The integrative nature of the quantitative research study with the stated independent variables may provide a more comprehensive understanding of the relationship between these variables and the rate of violent crime. An understanding of the relationship between the independent and the dependent variables will help policy makers in the wise allocation of resources to fight violent crime.

Problem Statement

Washington, DC; Indianapolis, IN; Philadelphia, PA; Boston, MA; Kansas City, MO; Los Angeles, CA; and Pittsburgh, PA have experienced high levels of violent crime for the past 2 decades. Even when violent crime fell in some of the aforementioned cities across the United States, those cities still had high levels of violent crime (Gill et al., 2014). Some researchers asserted that increases in police patrols had nothing to do with the reduction of violent crime, but rather attributed the change in violent crime rates to other factors, such as unemployment (Rafael & Winter-Ember, 2000), cost of living (inflation rates; Seals & Nunley, 2007), years of education (Lochner & Moretti, 2001), homeownership (Ni & Decker, 2009), and unemployment compensation (Levitt, 2001). I

analyzed the nature of the relationship between each of the independent variables (police patrols, unemployment, cost of living [inflation], years of education, homeownership, and unemployment compensation) and the dependent variable (the rate of violent crime).

For policy makers to design strategies that reduce the rate of violent crime, data to support effective strategies so that resources are not wasted must exist. Through the study, I determined whether increased police patrols and the other independent variables in the seven cities are related to violent crime rates in each of these cities. The strength and direction of each relationship, if statistically significant, could assist policy makers to make better choices in resource allocation.

Purpose of the Study

The purpose of this study was to determine the nature of the relationship between the independent variables (police patrols, unemployment rate, years of education, home-ownership, cost of living [inflation], unemployment compensation), and the dependent variable (the rate of violent crime) in seven major U.S. cities. The hypothesis was tested using both correlational and regression analyses. Absolute causality was not determined; the study involved the method of quantitative numerical assessment and statistical procedures using a nonexperimental correlational regression research design to test the hypotheses and to evaluate the nature of the relationships between the independent variables and dependent variable. This study's contents contributed to the current state of knowledge regarding the historical (2000–2010) relationship between the stated

independent variables and the dependent variable of the rate of violent crime in the seven selected cities with high rates of violent crime.

Research Questions and Hypotheses

A debate regarding the role and relationship of the police or police patrols with the rate of violent crime among lawmakers, criminologists, researchers, and law enforcement agencies exists (Gill et al., 2014; Hoelzer & Gorman, 2011; Ritchey & Nicholson-Crotty, 2011; Vollaard, 2005; Vollaard & Hamed 2009). Some criminologists have held the position that the police are not critical to the solution of crime and that no relationship exists between the police and reduction in crime (Marvell & Moody, 1996). Others have asserted that the police could be critical in crime prevention or reduction (Vollaard, 2005). With this debate in mind, I developed the following research and hypotheses to guide my study:

Research Question 1: What is the nature of the relationship between the rate of police patrols (as measured by foot patrols, automobile patrols, and motorcycle patrols) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010?

Null Hypothesis 1: There is no statistically significant relationship between the rate of police patrols (as measured by foot patrols, automobile patrols, and bicycle patrols) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 1: There is a statistically significant relationship between the rate of police patrols (as measured by foot patrols, automobile patrols, and bicycle patrols) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 2: What is the nature of the relationship between the rate of unemployment (as measured by the monthly unemployment rate of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010?

Null Hypothesis 2: There is no statistically significant relationship between the rate of unemployment (as measured by the monthly unemployment rate of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 2: There is a statistically significant relationship between the rate of unemployment (as measured by the monthly unemployment rate of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 3: Based on archival data (2000–2010), what is the relationship the between the level of education (as measured by the average

number of months a citizen of the city has completed school) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate?

Null Hypothesis 3: There is no statistically significant relationship between the level of education (as measured by the average number of months a citizen of the city has completed school) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 3: There is a statistically significant relationship between the level of education (as measured by the average number of months a citizen of the city has completed school) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 4: What is the relationship between the rate of home ownership (as measured by the monthly home ownership rates of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010?

Null Hypothesis 4: There is no statistically significant relationship between the rate of home ownership (as measured by the monthly home ownership rates of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 4: There is a statistically significant relationship between the rate of home ownership (as measured by the monthly home ownership rates of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 5: What is the relationship between the cost of living (as measured by annual inflation rates) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010?

Null Hypothesis 5: There is no statistically significant relationship between the cost of living (as measured by annual inflation rates) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 5: There is a statistically significant relationship between the cost of living (as measured by annual inflation rates) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 6: What is the relationship between the rate of unemployment compensation (as measured by the weekly unemployment compensation) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010?

Null Hypothesis 6: There is no statistically significant relationship between the rate of unemployment compensation (as measured by the weekly unemployment compensation) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 6: There is a statistically significant relationship between the rate of unemployment compensation (as measured by the weekly unemployment compensation) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Theoretical Framework for the Study

The framework that grounded this study was the concept of crime deterrence or reduction, originating from the writings of Beccaria (1738–1794) in Italy and Bentham (1748–1832) in England. Deterrence theory grounded this study to a larger theoretical framework because of the emphasis on deterrence via punishment and sanctions to prevent or minimize criminal behaviors in individuals and the population at large (Ritchey & Nicholson-Crotty, 2011). Because this study pertained to the relationship between the six independent variables and the dependent variable, deterrence theory, supported by social control theory and economic theory of crime causation, comprised an appropriate framework for this study.

Deterrence Theory

The focus of deterrence theory is that punishment serves as a way to minimize and prevent criminal behaviors (Ritchey & Nicholson-Crotty, 2011). Deterrence operates in two ways: (a) specific and (b) general (Paternoster, 2010). Specific deterrence refers to the punishment of an individual to discourage him or her from committing another crime, whereas general deterrence refers to punishment given to an individual with the intent of making an example for the general population.

Empirical support for deterrence theory is mixed (Piquero, Paternoster, Pogarsky, & Loughran, 2011). While some studies show support for deterrence theory, providing empirical evidence that sanctions can prevent or minimize offenses (Pauwels, Weerman, Bruinsma, & Bernasco, 2011), other studies show that deterrence theory is more effective in deterring some types of crime than others (Durlauf & Nagin, 2011; Tonry, 2008). Pauwels et al. (2011) showed that sanctions can decrease adolescent offending and that morality may also have an influence on the relationship of crime and punishment, suggesting that "the less a person morally supports specific types of offending, the more strongly that person is affected by perceived sanctions" (Pauwels et al., 2011, p. 386).

Tonry (2008) found mixed results in establishing punishment as a deterrent factor in offending. In more serious crimes, Tonry suggested that sanctions are not effective deterrents for specific or general purposes. Sanctions may be more effective in nonserious crimes, such as traffic violations, tax evasion, and speeding offenses.

In a literature review conducted by Durlauf and Nagin (2011), the researchers stated that lengthy prison sentences do not deter criminal offenses, suggesting that long sentences may not be an effective form of punishment. Durlauf and Nagin stated that sanctions might be effective deterrents based on the perceived risk and severity of the sanction. Social control theorists believe that any person would commit a crime if that person could go undetected (Ritchey & Nicholson-Crotty, 2011). Many U.S. cities have utilized deterrence theory and increased police presence with success.

Social Control Theory

The social control theory relating to social support is an alternative view on crime, placing emphasis on strengthening the relationships of individuals in order to avoid deviant and antisocial behaviors instead of relying on punishment (Hirschi, 2001). The assumption of social control theory is that an individual will violate the law if he or she can get away with it (Ritchey & Nicholson-Crotty, 2011). Family relationship is one social relationship that has significance to this theory because of the role of family in the lives of individuals. Compared to deterrence theory, social control theory relating to social support has a more positive view on criminals, emphasizing positive reinforcement instead of punishment.

Researchers have conceptualized social control in various forms, which include attachment, self-esteem, school climate, and family systems (Chen, Cheng, Liang, & Sato, 2012; Dymnicki, 2014; Peguero, Popp, Latimore, Shekarkhar, & Koo, 2010; Rutherford, 2011). The finding of most studies pertaining to social control theory is that

positive social bonds are negative predictors of delinquency and criminal behaviors (Boman, Krohn, Gibson, & Stogner, 2012; Chen et al., 2012). Positive social bonds can be manifested in the relationship of individuals to family, friends, school, and the community (Chen et al., 2012; Rutherford, 2011).

Most researchers have found that positive parenting prevents criminal and antisocial behaviors (Dymnicki, 2014). For instance, parent-child problems and maltreatment can be a predictor of future delinquency. However, Chen et al. (2012) did not find any significant relationship between the two variables.

In a path analysis study conducted by Rutherford (2011), the researcher combined social control theory and differential association theory to explain delinquency in terms of familial variables. The researcher found that positive self-esteem is an antecedent of juvenile delinquency (Rutherford, 2011). Rutherford also found that relationship with peers who are engaged in delinquent activities and familial stressors are predictive of juvenile delinquency. Delinquents tend to have a stronger or more intense type of friendship compared to nondelinquents (Boman et al., 2012).

School environment was the focus of Chen et al.'s (2012) study on delinquency using the social control theoretical framework. In terms of the general relationship of school and delinquency, school climate was a predictor of risky behaviors and delinquency. With regard to specific school climate factors, Chen et al. found that children who are engaged in positive prosocial activities, such as sports and church activities, are less likely to engage in delinquent activities.

Although social support, a variation of social control, seems to be an alternative strategy to deterrence in crime reduction, this study pertained to investigating if a relationship exists between violent crime and the independent variables of police patrols, unemployment, homeownership, years of education, cost of living (inflation), and unemployment compensation. I did not focus on finding out which of the two strategies, social support and deterrence, is better in crime reduction.

Economic Theory of Crime Causation

This study was also grounded in the economic theory of crime causation. Researchers have mostly focused on economic analysis of crime regarding the effects that incentives have on criminal behavior and the evaluation of alternative methods to bring about the reduction of crime (Kleemans, 2012). Economic theories on crime have proven the causes of crime to be diverse, and Becker (1968) confirmed the independent variables of unemployment, lack of education (or marketable skills), and cost of living (inflation) to be related to crime rates. Economic theories of crime also contend that an alternative to the deterrence theory would be to improve on the factors that drive people into criminal activities. For example, if schools receive no funding and are therefore ineffectual, people cannot continue on to higher education or get high-paying jobs, resulting in a lack of financial resources. This study involved addressing a decline in wages, inflation or high cost of living, and unemployment as alternatives to sanctions and punishment in fighting crime. The economic theory asserts that criminals make choices after a cost-benefit analysis regarding their engagement in criminal activities. If people

perceive that legitimate employment earns them low wages compared to illegitimate activities, they might take the risk of being caught and punished (Kleemans, 2012).

Economic theory asserts that a relationship exists between the dependent variable of crime and the independent variables of unemployment, years of education, homeownership, cost of living (inflation), and unemployment compensation (Becker, 1968). Through this study, I determined the nature of the relationship between these variables, police patrols, and violent crime rates. Determination of the strength and direction of the relationship between these independent variables and the dependent variable of violent crime rates occurred using correlation and multilinear regression. The value of this study was also regarding the integrative approach, using both deterrence theory and the economic theory strategy. The correlation and multilinear regression analyses revealed the nature of the relationship between these independent variables and the dependent variable. The strength and direction of these relationships may be useful guides to policy makers and lawmakers in decision-making and prediction of violent crime (Kruger, 2011).

In the 18th century, legal and penal reform addressed deterrence theory or doctrine. The main features of the deterrence theory of crime by Beccaria and Bentham were certainty, severity, and celerity of punishment (Ritchey & Nicholson-Crotty, 2011). I decided to use the theory of deterrence in this study and not the theory of desistance because the study was about crime prevention and not about why criminal offenders stops

committing crime, or desistance. In addition, desistance had definitional, measurement, and theoretical incoherence with study's focus (Paternoster, 2010).

The role of the police and police patrols became prominent in deterrence theory in the late 20th and early 21st centuries with the development of control theories, such as social control theory. When the World Health Organization asked why many people conformed with legal and cultural norms, control theorists believed that social controls prevented people from committing crimes and that crimes would be committed if the social controls were broken (Lauritsen, Rezey, & Heimer, 2014). Social controls seem to have an adverse relationship with the development of implicit morality (Hirschi, 2001).

Nature of the Study

This study followed a research design involving correlational archival data from 2000–2010, collected from each of the seven cities with regard to the rate of violent crimes. The data used were open sourced data retrieved from Federal Bureau of Investigation (FBI) databases (see Appendix X). A quantitative approach is ideal for examining the nature of the relationships between the independent variables and the dependent variable (Neuman, 2005).

Creswell (2009) asserted that a correlation design examines the relationship between two or more variables in a single group and further stated that a regression can also predict a relationship between independent variables and the dependent variable. Kruger (2011) pointed that although a relationship may exist between variables in a correlation, researchers should not conclude that one independent variable is causing the

dependent variable to change. Causation may be a result of the effect of two or more independent variables on the dependent variable (Creswell, 2009). I therefore determined the strength and direction of the relationship between each of the six independent variables and dependent variable.

Definition of Terms

Police Patrol: A police patrol is a police officer or a group of police officers who have the responsibility to enforce laws that could include traffic control, crime prevention, and control of crowds at a given area, which can include on foot, in a vehicle, or on a motorcycle (O'Connor, 2010).

Assumptions

I held the following assumptions regarding the study:

1. The historical data were accurately entered into the retrieval database.
2. The study variables were available in a coherent, analyzable form.
3. All unmeasured confounding variables were accounted for in the interpretation of the findings.
4. The sample studies analyzed in the study had external validity considerations that could be used for generalization (Trochim, 2001).
5. The data reported were reliable and met the states' and FBI's quality guidelines.

Scope and Delimitations

The scope of this study was limited to making conclusions regarding the relationship of six independent variables with the dependent variable, both individually (correlations) and as a group (linear regression). Predictions were only made from the results of the regression analysis; no absolute causal relationships were made. The only independent variables examined were the six listed in this chapter to assess their potential as predictors of rates for violent crime in an aggregate group of seven cities. The study did not include controlling for extraneous variables so that results produced absolute causal conclusions. To assert absolute causation, one needs to take into consideration the research design (Kruger, 2011).

The study did not involve addressing the problem of crime displacement—the movement of crime from one place to another as a result of a large number police in the original place—apart from the analysis of some of the studies included in the literature review (Levitt, 2004). The sample only included 114 cases of violent crimes in each city ($N \geq 798$) during the period 2000–2010, based on the power analysis calculations further detailed in Chapter 3 and included in Appendix X.

Limitations

I carefully selected historical empirical research studies on the basis of the rigor of quantitative correlational research designs using archival data. While quantitative studies can be useful for statistically analyzing research questions and hypotheses, such designs are unable to measure adequately the depth of experiences inherent within a

qualitative study. In addition, some confounding variables may account for the relationships established in the findings. I acknowledged this limitation, and interpreted statistical findings with caution. Finally, the selected cities were included based on the literature indicating the presence of significant trends on rates of violent crime that have withstood the processes of validity and reliability defense.

Significance of the Study

Various prior researchers (Gill et al., 2014; Hoelzer & Gorman, 2011; Philadelphia Foot Patrol Experiment, 2009) conducted studies in many cities in the United States and other cities in Western Europe. These researchers have asserted that increased police patrols on the streets of a city or town can deter or reduce violent crime (Draca, Machin, & Witt, 2011; Duborg, Hamed, & Thomas, 2005; Vollaard & Hamed, 2005). However, some of these researchers did not use an integrative approach that combined the economic variables and the increased police patrol variable to determine how each variable was related to violent crime and to determine the findings' relevance to other cities.

The findings of this study could also be applicable to other cities in the United States. The value of this study existed in providing reliably obtained data and validly constructed findings that policy makers or academicians can use to further a useful conversation about determining a strategy to fight violent crime effectively. I hoped to establish an understanding of the nature of the relationship between the independent variables and the rate of violent crime by analyzing the contribution that several

independent variables make to the relative change in a dependent variable (Kruger, 2011). By using correlation analyses, I also intended to give a mathematical measurement of the statistical significance and strength of the relationship between the six independent variables and the dependent variable of the rate of violent crime.

Contrary to the view that correlational studies are of little value to social science research because they fall short of establishing absolute causation, researchers usually conduct these studies to address the questions of whether variables are significantly related or not and to what degree and direction the variables are related (Kruger, 2011). When a relationship is established in terms of strength and direction in a correlational study, it forms the basis for prediction, which is usually done before making expenditure decisions. The use of regression analysis is beneficial for public policy decisions (Bernard, 2000). Multiple regressions also help to develop theories of causation that have roots in the relationships between strength and direction (Kruger,2011).

As Vollaard (2006) stated, the two most important functions of government are to fight crime and to maintain peace and order; however, conflicting information exists regarding the methods that need to be taken. In addition to the conflicting information that policy makers have about the best strategy to fight crime, policy makers also face a scarcity of resources because of the multifarious problems affecting communities. It would be in the interest of taxpayers that the money spent by government accomplished something. Taxpayers' money can be wisely spent if the policy makers have empirical

information to help make their decisions related to expenditures on the independent variables and the rate of violent crime.

If policy makers reach a decision that more police patrols would be the answer in combating violent crime, it would involve hiring more police officers (Tabarrok, 2004). Hiring police in most jurisdictions has been and is still a perennial budget management issue (Groff, Johnson, Ratcliffe, & Wood, 2013). If the decrease of violent crime is more empirically related to one or more of the economic variables rather than police patrols, lawmakers should also base their decisions on those findings.

This study could bring about social change because policy makers may use data provided in this research to guide their decisions about effective strategies to reduce violent crime. If the use of data enables policy makers to make informed decisions in fighting violent crime, it could bring about positive social change.

Summary

Criminologists, social scientists, and many other researchers still debate the efficacy of the rate of police patrols in relation to the rate of violent crime. Conservatism and liberalism are at the opposite extremes of the continuum regarding the strategies used in solving and deterring crimes in the United States (Akesson et al., 2012). One proposition of using the police to reduce or deter violent crime was countered by a prolific corpus of research. The studies discussed in the literature review in Chapter 2 expound on this scholarly argument. Marvell and Moody (1996) found, in a more rigorous research design, that the rate of police patrols did not negatively correlate with

the rate of violent crime. In addition, Marvell and Moody (1996), Gill et al. (2014), and Kovandzic and Sloan (2002) found strong evidence that the rate of police patrols was significantly and negatively related to rates of violent crime, especially homicide rates at the city and state levels of analysis. Chapter 3 presents further information on these rates.

A shift has taken place in support of the theory that a positive and statistically significant correlation exists between the rates of police patrol and rates of violent crime because of the solution that many researchers have found for the problem of endogeneity. Research methods and tools have improved with more powerful and more accurate software for measurement. In the late 20th and early 21st centuries, most of the research showed that increased police patrols decreased violent crime (Vollaard & Hamed, 2009). Many researchers found that the methodology used by prior researchers was problematic. The statistical analyses used by prior researchers were not suitable to solve the problems of simultaneity and the incomplete control variables biases (Kovandzic & Sloan, 2002).

Through this study, I examined the efficacy of the deterrence theory, as originating from the works of Bentham and Cesare (Paternoster,2010). The theory operates under the framework that increased police or increased police patrols will reduce violent crimes (Ritchey& Nicholson-Crotty, 2011). This study involved analyzing prior studies conducted in many cities in the United States to examine whether increased police patrols can deter or reduce violent crime in Washington, DC; Indianapolis, IN; Philadelphia, PA; Boston, MA; Kansas City, MO; Los Angeles, CA; and Pittsburgh, PA. Braga (2006), Braga et al. (2001), Cohen and Ludwig (2003), Draca et al. (2008), and

Hoelzer and Gorman (2011) have shown that increased police patrols are correlated with reduced violent crime.

The results of this study may have implications for social change because knowing what works to deter violent crime could help lawmakers make decisions. Many cities, including Washington, DC, spend a lot of money and resources to fight violent crime. For instance, the Justice Department awarded a $1 million grant to enable the Washington, DC Metropolitan Police Firearms Identification Unit to fight against violent crime (National Association to Restore Pride in America's Capital [NARPAC], 2007). In 2006, when violent crime increased in DC, police patrol overtime increased to $4.2 million (NARPAC, 2006). The cost of fighting violent crime has put responsibility on lawmakers to know what strategies work to reduce violent crime and thereby avoid wasteful spending. Policy makers need to stop and redirect resources expended on ineffective strategies to effective strategies. Cities with high crime rates usually suffer from low economic growth. In addition, cities or towns with low crime rates are more likely to attract investors, thereby improving the socioeconomic status of their communities (Kulawczuk, 1998). Therefore, lawmakers might find it useful to know if more police patrols could deter violent crime to enable themselves to make educated decisions for the benefit of their communities.

Researchers studied extensively in the 1970s, 1980s, and 1990s to address this public policy issue but did not arrive at a conclusion. The researchers in the 1980s and 1990s found that police patrols on the streets of towns or cities negatively correlated with

the rate of violent crime. Chapter 2 details these findings in the literature review and highlights the progression of the research from the 1970s to the present. In the literature review, I examined, analyzed, and synthesized the past and current literature on the subject to establish the foundation for better understanding of the research. Chapter 3 outlines the methodology of the study.

Chapter 2: Literature Review

Introduction

Washington, DC; Indianapolis, IN; Philadelphia, PA; Boston, MA; Kansas City, MO; Los Angeles, CA; and Pittsburgh, PA have experienced high levels of violent crime for the past 2 decades. Even when violent crime fell in some of the aforementioned cities across the United States, those cities still had high levels of violent crime (Gill et al., 2014). This study analyzed the nature of the relationship between each of the independent variables (police patrols, unemployment, cost of living [inflation], years of education, homeownership, and unemployment compensation) and the dependent variable (the rate of violent crime). The data used in the study came from the Uniform Crime Reporting Program that has been vetted by Federal Bureau of Investigation (FBI).

The FBI Uniform Crime Reporting (UCR) Program collected the violent crime data reported for the seven cities to ensure that the data collection followed the guidelines (https://www.fbi.gov/about-us/cjis/ucr/data_quality_guidelines). Submitting UCR data to the FBI is a collective venture on the part of the city, county, and state (p.1). The state UCR program reports crimes using the uniform offense definitions to a centralized repository within their state (p.1). The state depository forwards the data to the FBI after clearing the reports of any inaccuracies (p.2). Those in states who do not have a state UCR program send their data directly to the FBI (p.3). Staff members at the FBI review the information or data for accuracy and reasonableness and enter the data into the national database (p.3).

The FBI has some basic procedures to ensure that UCR data are accurate, which are:

1. Check data for its logical consistency.
2. Check data for reasonableness.
3. Ensure that other statistical edit functions are processed within established parameters (p.3).

Apart from the internal quality assurance measures, the FBI also gives on-site reviews of the records of the law enforcement agencies that submit UCR data to the FBI (p.4). The FBI has a team of auditors who conduct periodic reviews of UCR crime data collected and reported by the program's data contributors (p.5). Each state UCR Program is subject to review at least once every 3 years to evaluate the state's compliance with national UCR guidelines (https://www.fbi.gov/about-us/cjis/ucr/data_quality_guidelines). This chapter includes the literature search strategy, theoretical foundation, literature review related to key variables and concepts, and closes with the summary and conclusions.

Literature Search Strategy

The research process of peer-reviewed articles began with searches using the following databases: ABI/INFORM Complete, EBSCOHost, Emerald Management Journals, SAGE Premier, ProQuest Central, Thoreau, and Google Scholar. I accessed the aforementioned databases through the Walden University library. I used different combinations of keywords related to the sections of the literature review to locate peer-

reviewed research studies. Some of these keywords included: violent crime, saturated patrols, routine patrols, random patrols, deterrence theory, economic theory of crime, causation, correlation, etc. The majority of these articles, from peer-reviewed journals, were published between 2010 and 2015. The review of professional and academic literature includes four main sections, with the first topic covering framework for this study and the three other topics directly relating to the role of police patrols on the reduction of violent crime.

Theoretical Foundation

Deterrence Theory and Crime

Schelling developed deterrence theory in 1966 as a preventative military strategy during the Cold War (Paternoster, 2011). The emphasis of deterrence theory is that punishment serves as a way to minimize and prevent criminal behaviors (Ritchey & Nicholson-Crotty, 2011; Rizzolli & Stanca, 2012). Deterrence operates in two ways, (a) specific and (b) general (Paternoster, 2010; Piquero, Paternoster, Pograsky, & Loughran, 2011). Specific deterrence pertains to deterring an individual from committing another crime, whereas general deterrence pertains to punishing an individual as an example to the general population (Ritchey & Nicholson-Crotty, 2011).

Empirical support for deterrence theory is mixed (Piquero et al., 2011). Some studies show support for deterrence theory, providing empirical evidence that sanctions can prevent or minimize offenses (Pauwels, Weerman, Bruinsma, & Bernasco, 2011).

Some studies show that deterrence theory is not effective in deterring all types of crimes (Durlauf & Nagin, 2011; Tonry, 2011).

Pauwels et al. (2011) examined if sanctions prevent adolescent offending in a European sample and showed that they could do so. The results also showed that morality may have an influence on the relationship of sanction and offending, suggesting that "the less a person morally supports specific types of offending, the more strongly that person is affected by perceived sanctions" (Pauwels et al., 2011, p. 386). Tonry (2011) found mixed results in establishing punishment as a deterrent factor. For more serious crimes, Tonry suggested that sanctions are not effective deterrents. Sanctions may be more effective in non-serious crimes, such as traffic violations, tax evasion, and speeding offenses (Tonry). In a literature review conducted by Durlauf and Nagin (2011), the researchers contended that lengthy prison sentences do not deter criminals, suggesting that they may not be an effective form of punishment. Durlauf and Nagin stated that sanctions might be an effective form of deterrent based on the perceived risk and severity of the sanction.

Past, related studies showed that sanctions can decrease adolescent offending. Social control theorists assumed that everyone would violate the law if they were not detected (Ritchey & Nicholson-Crotty, 2011; Rizzolli & Stanca, 2012). Many U.S. cities have utilized deterrence theory and increased police presence, and were successful (Ritchey & Nicholson- Crotty). Deterrence theory may contribute to explaining the results of the study.

Social Control Theory and Crime

Social control theory has evolved over time and was adopted and revised to pertain to crime by Hirschi in 1990 (Papachritos, Meares, & Fagan, 2012). The social control theory relating to social support is an alternative view on crime, putting emphasis on strengthening the relationships of individuals to avoid deviant and antisocial behaviors instead of relying on punishment (Hirschi, 2001). The assumption of social control theory is that individuals would violate the law if they could get away with it (Papachritos, Meares, & Fagan, 2012). Family relationship is one social relationship that has significance regarding this theory because of the role of family in the lives of individuals. Compared to deterrence theory, social control theory relating to social support has a more positive view on punishment, emphasizing positive reinforcement instead of punishment.

Researchers have conceptualized social control in various forms, which include attachment, self-esteem, school climate, and family systems (Chabay, 2013; Peguero, Popp, Latimore, Shekarkhar, & Koo, 2010; Pietromonaco, Uchino, & Dunkel Schetter, 2013). The general finding of most studies pertaining to social control theory is that positive social bonds are negative predictors of delinquency and criminal behaviors (Boman, Krohn, Gibson, & Stogner, 2012; Hay, Meldrum, & Piquero, 2012). Positive social bonds can be manifested in the relationship of individuals to family, friends, school, and the community (Cusick, Havlicek, & Courtney, 2012; Hay et al., 2012).

The prevailing finding in terms of the relationship between parents and delinquency is that positive parenting prevents criminal and antisocial behaviors (Dymnicki, 2014; Lösel, Stemmler, & Bender, 2013). For instance, parent-child problems and maltreatment can be a predictor of future delinquency. However, Gault-Sherman (2012) did not find any significant relationship between the two variables.

In a path analysis study, Rutherford (2011) combined social control theory and differential association theory to explain delinquency in terms of familial variables. The researcher found that positive self-esteem is an antecedent of juvenile delinquency (Rutherford, 2011). The researcher also found that relationships with peers who are engaged in delinquent activities and familial stressors are predictive of juvenile delinquency. Delinquents tend to have a stronger or more intense type of friendship compared to non-delinquents (Boman et al., 2012).

School environment was the focus of Klein, Cornell, and Konold's (2012) study on delinquency using the social control theoretical framework. In terms of the general relationship of school and delinquency, school climate was a predictor of risky behaviors and delinquency (Boman & et al., 2012). With regard to specific school climate factors, Chen et al. (2012) found that children who are engaged in positive, prosocial activities, such as sports and church activities, are less likely to engage in delinquent activities.

Economic Theory of Crime Causation

Another theory on which this study was grounded is the economic theory of crime causation. Becker (1968) reformed the economic theory of crime causation in 1968 in an

effort to assess criminal justice policies. Economic analysis of crime has mostly focused on the effects that incentives have on criminal behavior and the evaluation of alternative methods to bring about the reduction of crime (Draca & Machin, 2015). Economic theories showed the diverse causes of crime, and Becker (1968) advanced independent variables, such as unemployment, lack of education (or marketable skills), and cost of living (inflation), to be related to crime rates. Economic theories of crime also contend that an alternative to the deterrence theory in crime reduction would be to improve on the factors that drive people into criminal activities (Draca & Machin, 2015). Neglecting to provide proper education could increase the prevalence of crime. A decline in wages, inflation or high cost of living, and unemployment were addressed as alternatives to sanctions and punishment in fighting crime (Becker,1968). The economic theory asserted that criminals make choices after a cost-benefit analysis regarding their engagement in criminal activities (Becker). If people perceive that legitimate employment earns them low wages compared to illegitimate activities, they would take the risk of being caught and punished (Draca & Machin, 2015).

In a quantitative study, Fagan (2010) explored the deterrence of crime among juvenile offenders and found that racial disparities and underprivileged economic conditions directly correlated to an increase in the commission of violent crime among these individuals. Fagan also asserted that these individuals often committed crimes as a reaction to their economic surroundings. Furthermore, individuals who became repeat offenders did so in response to the actions of their peers. Fagan further contended that

the best response to reducing these offenses would be to focus on deterring the opportunity for crime in their environment.

Literature Review Related to Key Variables and Concepts

Ineffectiveness of Police Patrols as Deterrence to Crime

The earliest known research or experiment in the United States that focused on examining whether police patrols reduced violent crime was The Kansas City Preventive Patrol Experiment (Wain & Ariel, 2014). The Kansas City Police Department conducted an experiment from October 1, 1972 through September 30, 1973. The objective of the experiment was to measure the effect that routine patrol had on the incidence of crime and the public's fear of crime (Wain & Ariel, 2014). The quasi experiment involved three controlled levels of routine preventive patrol. The area termed *reactive* had no preventive patrol. Police only came into this area when called by citizens for help. In essence, this area had considerably reduced police visibility (Wain & Ariel, 2014).

The second area of the quasi experiment (Wain & Ariel, 2014), the *proactive*, had police visibility increased to two or three times its usual visibility level. The third area was the *control*, wherein the police maintained the same level of visibility. The three areas, *reactive, proactive*, and *control*, experienced no statistically significant difference in the levels of crime, citizens' attitudes toward police services, citizens' fear of crime, police response time, or citizens' satisfaction with the time police responded to calls (Wain & Ariel, 2014). According to the Wain and Ariel (2014), the experiment showed

that routine preventive patrol in marked police cars had little value in the prevention of crime or making the citizens feeling safe.

Wain and Ariel (2014) also reported findings regarding police attitudes toward routine preventive patrol. Larson (1975) criticized the experiment because the experimenters had not defined the concept of the traditional routine preventive patrol and the vague concept the experimenters had was not explained to the officers in a standardized way. Individual police officers had to decide the value and effectiveness of the routine patrol through their own personally developed criteria. The police officers interviewed were not certain as to the degree of routine patrol effectiveness. The majority of the participants indicated that they would make changes if given the opportunity, but some were accepting of the traditional routine as police officers. The Kansas City Preventive Patrol Experiment (Wain & Ariel, 2014) was relevant to this study because it is the earliest known experiment to test the assumption whether police patrols could be effective in crime prevention and reduction. In spite of its mixed reviews, the experiment laid the groundwork for further research on the subject.

Larson (1975) examined the design of the experiment to ascertain the conditions under which the Kansas City Preventative Patrol conducted the experiment. Larson questioned if the experiment maintained the conditions in the design in the execution of the experiment. Larson further raised questions about the types of data the police department researchers used in evaluating the findings. Because of the flaws in the experiment's design, execution, and documentation of findings of the Kansas City

Experiment, Larson concluded that the findings should not be used to extrapolate the general value of a visible patrol presence.

Larson (1975) identified the following shortcomings in the Kansas City Preventive Patrol Experiment:

1. The researchers did not make a description of the dispatch procedures in the Kansas City Experiment. This description was important because it would have played a key role in making a determination regarding how units spent their committed time; besides, dispatch procedures affect many of the performance measures that had a bearing on the experiment. A disregard to describe the dispatch procedures affected the outcome of the findings.
2. There was no explanation for the manning levels for the experiment. This lapse also made it difficult to compare the existing manning levels in the experimental area to the manning levels during the experiment.
3. The researchers often relied heavily on performance measures, as perceived by the citizens or participant observers. Though this approach was useful, the actual data could have been more useful in some cases. A dearth of reliable data described call-for-service volume, travel times, on scene service times, and time-of-day variations.
4. Another flaw by the researchers was the participant-observers' method of choosing beats and cars. They favored those with a heavier workload that

biased the results in respect to travel time analysis, which could have also biased the police-citizen encounters and the police noncommitted time.

Risman (1980) differed with Larson's (1975) evaluation of the Kansas City Preventive Patrol. Risman asserted that if visibility was a causal factor for any of the dependent measures that Larson (1975) contested, the pairwise tests of significance between two conditions—the levels of police presence in proactive and reactive beats—should have yielded statistically significant results. The pairwise tests of significance are the most liberal of procedures for analyzing the data collected.

Risman (1980) further disagreed with Larson that the negative results on nearly all measured dependent variables, reported crime rates, official crime rates, victimization surveys, and citizens' perception of police presence, and service, were the effects of an inadequate design. Risman further asserted that the negative results are indicative of realistic variability in preventive patrol and that although Larson used his model to make an approximation of mileage traveled per shift in the reactive and controlled beats, he neglected to compute a parallel approximation of mileage for the proactive beats. An explication of these neglected approximations of mileage for the proactive beats would make it clear that patrol visibility in the proactive beats quadrupled the visibility in the reactive beats, and doubled the visibility in the control beats. According to Risman, a complete computation would show that the variability in preventive patrol within the range of no-patrol to two or three cars per beat did not significantly affect crime rates or citizen perceptions in the experiment.

Another early experiment to address the hypothesis as to whether police patrols could have any significant effect on the reduction of crime was the Newark Foot Patrol Experiment (1981). The impetus for the experiment was the desire by police departments, policy makers, and citizens to know how to do more with fewer resources in a situation where criminal activity has proliferated. Police departments in particular must be efficient (Police Foundation Research Brief, 1981).

Foot patrol is one of the services frequently demanded by citizens, who often link foot patrol with their feeling of safety in their neighborhoods (Police Foundation Research Brief, 1981). Many citizens have expressed a feeling of safety with their close contact with the police. Citizens also felt more secure when police were visible and were patrolling the streets. The assumption as to whether or not police patrols did, in fact, reduce crime needed testing.

Some police departments came to reject the function and viability of foot patrol as antiquated, expensive, and even an anachronism (Police Foundation Research Brief, 1981). Other departments thought it was irrelevant to contemporary policing strategies. Foot patrol also suffered because of the perception that foot patrol officers were low status. Foot patrols were also perceived as a form of punishment for officers who performed poorly. In 1973, however, the state legislation of New Jersey passed the Safe and Clean Neighborhoods Act. One of the specifically mandated parts of this legislature was the expansion of the presence and visibility of police protection, the foot patrol.

The design of the experiment demographically matched 8 feet patrol beats in Newark. The foot patrol continued in four randomly selected beats, while it discontinued in the 4 other beats. Foot patrols started in 4 beats where no foot patrols existed. The governor of New Jersey invited the Police Foundation to make evaluations on the foot patrol in 28 New Jersey cities with Newark selected as the primary evaluation site from February 1978 until January 1979. The results indicated that introducing foot patrol combined with other strategies was effective in building a perception of safety among the people.

The Newark Foot Patrol Experiment (1981) was a development in the quest for a proven assumption regarding the effectiveness of police patrols as a strategy for crime prevention or reduction. The findings of the experiment further moved the debate forward and subsequently researchers conducted further studies to get a clearer understanding on the issue. The Newark Foot Patrol Experiment was also one of the foundational studies during which researchers tried to learn about one kind of police patrol and its effectiveness on crime prevention and reduction. However, the researchers of the study did not find that police foot patrols reduced crime or violent crime (Newark Foot Patrol Experiment, 1981).

Research Establishing the Effectiveness of Police Patrols

In spite of the position of some researchers that police patrols do not reduce violent crime, a corpus of literature exists, asserting that police patrols do reduce violent crime and crime in general. The Flint Foot Patrol Program (1981) in Michigan was one

of the early experiments that increased the knowledge of researchers and policy makers regarding the efficacy of police foot patrols in decreasing crime or violent crime. As a crime reduction strategy, the foot patrol in Flint also went beyond the stated strategy in using foot patrol officers as part of a strategy in community problem solving. These trained officers in the program were to do more than act as a viable deterrent to crime (Andresen & Malleson, 2014).

Limited value of traditional patrol methods: Routine and random. The concept of the Flint Foot Patrol was a result of the recognition by law enforcement that the traditional methods of crime prevention, such as routine random patrol, had limited value (Andresen & Malleson, 2014). The search for more effective methods of deterring crime was evolving and the need for abandoning the traditional reactive methods of fighting crime was urgent. Instead of requiring the police to work harder, they were required to think harder and employ strategies that would make them more effective in fighting crime.

The Flint Foot Patrol was part of a community-oriented policing strategy that required a change in the balance of power between the police and the community (Andresen & Malleson, 2014). The police alone under this model did not determine what level of service to provide and the manner in which to provide the service. Both the police and representatives of the community as a stipulation of the Flint Program made decisions about police services.

Unlike the findings of the Newark Foot Patrol Experiment, which confirmed that foot patrol had no effect on crime, the Flint Foot Patrol Program found that the foot patrol brought about a 9% reduction in crime (Andresen & Malleson, 2014). The Flint Program also found that the satisfaction that residents had for police services was significant. Of the residents in Flint, 33% also knew the police officers by name, and 50% could recognize the beat officer. The findings of the experiment brought about a resurgence in the viability of police foot patrol as a useful police function.

Effectiveness of directed police patrols. The Indiana Project was one of the experiments that established increased police patrols would reduce violent crime if they were directed and not random (Andressen &Malleson). The other inference drawn from the project was that specific crimes had to be the focus if police patrols were to reduce crime. The project researchers suggested that, in accordance with the Kansas Gun Experiment, the efficacy of increased police patrols was contingent on how the patrols were conducted; the patrols would not be effective in reducing violent crime if they were random but would be effective in reducing violent crime if they were directed at specific crimes and areas (Andressen &Malleson)

In spite of the wide recognition of the foot patrol as a legitimate strategy in crime prevention, the automobile continues to be the dominant mode and look of the police patrol officer. Some researchers have also demonstrated that not all kinds of police patrol can have an effect on violent crime or crime in general. For instance, the Kansas City

Prevention Patrol Experiment was one of the examples that demonstrated that non directed police patrol would have no effect on reducing crime (Wain & Ariel, 2014).

The Kansas City Gun Experiment (1993) demonstrated that directed police patrols could reduce violent crime, especially gun crime. The experiment developed out of a federal grant, conducted in Kansas City, MO, at a time when handgun violence rapidly increased in the city and the nation as well (Jiao, 2014; Wellford & Lum, 2014). This national trend of gun violence that gripped the inner cities mostly resulted in high youth homicide rates (Karandinos, Hart, Castrillo, & Bourgois, 2014).

Arguments among scholars who posited various reasons for the situation did little to salvage the issue. Some scholars contended the deterrence power of having law-abiding citizens carry guns. Other researchers asserted that more availability of guns would result in increased gun homicides (Hemenway, 2014). The hypothesis implies that the strengthening of existing laws about concealed guns is sufficient in reducing gun-related crimes. The hypothesis needed to be tested to determine its validity.

The theory that ensued out of this program was that additional police patrols would increase seizure of guns that could in turn reduce gun crime (Hemenway, 2014). Deterrence and incapacitation were suggested by criminologists as possible mechanisms for crime reduction. The assumption of the deterrence theory was that if the police seized guns, illegal gun carriers would be less likely to carry them in the area. The incapacitation theory, on the other hand, was of the assumption that if enough potential

gun criminals in an area had their guns seized, their ability to commit gun crimes would diminish until perhaps the criminals were able to acquire new guns.

The project team knew from the start that confirmation of the hypothesis would hardly demonstrate that gun seizures resulted in reduced gun crime (Hemenway, 2014). They were cognizant of the fact that the design would not eliminate competing explanations that could be suggested from the results. The team therefore settled for finding an inverse correlation between gun seizures and reduction in violent crime, which could suggest the value of further research and development (Hemenway, 2014). An inverse correlation could also support a policy of extending the patrols.

The Pendleton Crime Reduction Project (2004) occurred at the beginning of September 2004 and ended in June 2005. The project was a partnership between Cincinnati City Council member, David Pepper, the Cincinnati Police Department, and the Ohio Service for Crime Opportunity Reduction (OSCOR). The aim of the project was to examine Cincinnati for crime patterns and the appropriate interventions given what the data showed. The researchers conducted analyses for an area located in the Pendleton neighborhood that was a relatively small neighborhood zoned for both residential and commercial land use. Madensen et al. (2005) found that 2,104 calls were made, and 37% originated within 500 blocks. The calls involved violence, disorder, drug activity, displays of weapons, wanted suspects, and parking violations in Pendleton.

The key interventions that the OSCOR used and evaluated were traffic barricades, directed police patrols, and Pendleton's Community Problem Oriented Policing (CPOP).

Madensen et al. (2005) stated that the directed police patrols that officers carried on bikes and on foot brought about a decrease in crime during the patrols but that criminal activity resumed after the directed patrol ended. The directed patrols could not continue because of resource limitations. The CPOP teams that set up the barricades disbanded because of rising tension with the Pendleton Community Council. The researchers were not able to gather details to calculate the efficacy of this intervention strategy and little suggested that the intervention had a significant effect on crime (Madensen et al., 2005).

Madensen et al. (2005) developed a comprehensive list of interventions to address the open-air drug markets in Pendleton. High visibility patrol surveillance was ranked highest among law enforcement activities to destroy the drug markets that were a source of much of the violence. Madensen et al. suggested that high visibility patrol surveillance that could be done by car, foot, bike, or horse, would be the most effective among the other intervention strategies, but that the effect would be short-term because of resource limitations and the inability of Pendleton to sustain the response for long periods of time.

Madensen et al. (2005) posited that even though directed police patrols could be effective in crime reduction, such patrols would need to occur in conjunction with other strategies. The researchers contended that police patrols cannot disrupt the drug markets, which were a large source of violence alone but would need the partnership of community members, leaders, city or county agencies, and other local organizations (Madensen et al., 2005). The study was relevant to my study because of the issue of whether increased police patrols could have a significant effect on crime or violent crime.

Madensen et al. believed that police patrols need to be supported by other intervention strategies for success. This project also explicated the problem of resource limitations that could affect the sustained implementation of police patrols to fight crime (Madensen et al., 2005). Police patrols on the streets could be the best intervention strategy to fight crime or reduce crime but a city, town, or jurisdiction may not have the resources to sustain the intervention.

The objectives of the researchers of the Kansas City Gun Experiment (1993) were to decrease crimes resulting from the use of guns. When the Police Foundation evaluated the experiment, it found that directed police patrols in gun crime *hot spots* reduced gun crimes by increasing the seizures of illegally carried guns. The following were specific findings of the evaluation of the experiment: (a) gun seizures increased by 65% resulting in a 49% decrease in gun-related crimes, (b) gun crimes and seizure did not change without patrolling, (c) homicides were reduced only within the target area, (d) citizens were less fearful about crime-related incidents within the target area, (e) traffic stops were the most useful method of gun seizures, and (f) two-thirds of arrests were made outside the target area (Madensen et al.). Unlike the Kansas City Preventive Patrol Experiment (1981) that was a random patrol, the Kansas City Gun Experiment was a directed patrol and proved to have a significant effect on the reduction of gun violence. Rosenfeld, Deckard, and Blackburn (2014) and Hart and Miethe (2015) found that 100% more directed police patrols produced less hot spot crime.

Role of foot patrol in crime reduction. The Philadelphia Foot Patrol Experiment (2009) challenged the long held opinion by many police departments and criminologists that police foot patrols did improve community perception of police and reduce fear of crime but did not reduce crime. A research collaboration between the Philadelphia Police Department and researchers in the Department of Criminal Justice at Temple University in some of Philadelphia's most violent areas produced findings that could bring about revisions of the traditional position that police patrols do not reduce crime (The Philadelphia Foot Patrol Experiment Research Brief, 2010).

The researchers of the Philadelphia Foot Patrol Experiment Research Brief (2010) selected 120 foot-beats from an identified potential of 129 for the experiment. The researchers ranked the foot beats by the weighted volume of violent crime and paired with a foot beat of a similar rate in crime (The Philadelphia Foot Patrol Experiment Research Brief, 2010). The selection of beat from each pair was determined in a random way. One became the target beat with the other as the control beat. The officers generally executed their patrols in pairs. The patrols commenced from Tuesday morning to Saturday night in two shifts, 10:00 am to 6:00 pm and 6:00 pm to 2:00 am. The researchers gave the police officers in the foot patrol area an initial intelligence brief. Within the targeted area, the results indicated: (a) a decrease in crimes of 20%, (b) a 12% decrease in crimes involving vehicles, (c) a 28% decrease in crimes involving drugs, (d) a 51% increase in traffic enforcement, and (e) a 13% increase in arrests (Hart and Miethe).

The researchers of the Philadelphia Foot Patrol Experiment Research Brief (2010) discussed the critical issue of crime displacement as a possible factor for the reduction of crime in the patrolled beat. Because some target areas were close to others, they had to combine the areas to examine the issue of crime displacement. The researchers concluded that some displacement occurred but not as much when compared to the target areas (The Philadelphia Foot Patrol Experiment Research Brief, 2010). Police patrols prevented 85 crimes in the target areas, offset by a 35 crimes increase taking place in the displacement areas that immediately surrounded the target areas. The results indicated that displacement occurred but the net benefit gained in the patrolled area in reducing crime was more than the percentage of displacement that occurred (The Philadelphia Foot Patrol Experiment Research Brief, 2010).

The findings of the Philadelphia Foot Patrol Experiment (2010) were contrary to a similar experiment in Newark in 1981 that did not find foot patrol to have an effect on crime reduction or prevention. The Philadelphia Foot Patrol was relevant to this research study because of the demonstration of the improved research design and methodology, and the hypothesis that increased police patrols can deter or reduce crime. Unlike the Kansas City Preventive Patrol Experiment and the Newark Foot Patrol Experiment that were random, the Indianapolis Directed Patrol Project (1997) targeted two areas, the north target beats that were approximately 3 square miles with about 16,000 residents. These beats were predominantly African American and low income. The east target beats covered an area of 1.7 square miles with approximately 14,000 residents. The east

beats had mostly White residents and a small percentage of Hispanics, and the area was also low income (Corsaro et al., 2012; Hoelzer & Gorman, 2011). The north target area had a homicide rate three times that of the city, and robbery and aggravated assault rates were almost twice that of the city (Corsaro et al., 2012). Property crime rate was slightly lower than that of the city. The homicide rate of the east area was between that of the north area and that of the city. The rate of robbery and aggravated assault was about twice that of the city. The east side unlike the north side had a higher rate of property crimes.

The east and north had slightly different strategies to their directed patrol initiative (Corsaro et al., 2012). The east increased the number of traffic stops in a more targeted fashion to increase the investigations of those people the patrol considered suspicious and focused on the seizure of illegal weapons and drugs (Corsaro et al., 2012). The east applied a general deterrence approach. Police increased motor vehicle stops to maximize a sense of increased police presence. The police in the east side stopped vehicles for any type of motor vehicle offense, such as an expired license plate or a taillight out. This approach was based on the assumption that increased police presence would deter offenders (Corsaro et al., 2012). The patrol also anticipated that the large number of vehicle stops would yield seizures of illegal weapons and drugs. Unlike the east, the north district followed a specific deterrence or targeted offender approach that involved more vehicles for inspection (Corsaro et al., 2012). The police patrol was more likely to stop cars that drove slowly through known drug-selling areas and those cars that

exhibited a traffic infraction, or sped through the neighborhood. The north patrol expended resources on suspected individuals and illegal behavior to improve seizure of guns (Corsaro et al., 2012).

Police Numbers do Matter in Crime Reduction

Gill et al. (2014) and Vollaard and Hamed (2012) asserted that increases in the number of police have a positive correlation, which differed from the assertions of Kleck and Barnes (2014) and Weisburd, Hinkle, Braga, and Wooditch (2015), who stated that police increases on the streets have insignificant effects on crime reduction. Among the four factors Levitt stated could explain why crime fell in the 1990s was increases in the number of police. Weisburd et al. doubted the correlation between a decline in crime and an increase in the number of police. The political response to increases in crime was to hire more police, which translated that the number of police affected crime rates. The endogeneity problem affected the clarity of the theory, until recent researchers addressed the problem. Marvell and Moody (1996) used the "Granger-Causality" approach on panel data to demonstrate that increases in the number of police were associated with reduction in crime in the future.

McElvain, Kposowa, and Gray (2012) found that increases in police or police patrols did not decrease crime. In another attempt to address the endogeneity problem, Corman and Mocan (2000) used high frequency time series data to reduce the problem. These researchers also used the approach for New York and found that elasticity ranged from -0.29 to -1.385 across crime categories with a median value of -0.452.

Levitt (1997) used the timing of mayoral and gubernatorial elections as a tool for the hiring of police. As politicians disproportionately increased the size of the police force before elections, and because elections were unlikely to affect crime directly, elections became a plausible instrumental variable. Through the strategy, elasticity estimates ranged between -0.05 and -1.98 across the crime categories with a median value of -0.79. McGary (2002), however, pointed out that the correctly computed standard errors made the point estimates statistically insignificant. Biderman (2012) stated a more precise estimated elasticity of -0.43 to -0.50.

The FBI tracked the number of police officers per captain in the UCR and reported that the increase of 50,000–60,000 police officers, approximately 14%, could account for crime reduction of 5–6% across the board (Biderman, 2012). Levitt's (1997) contribution to the debate about the negative effect of the increased number of police on the streets seemed to put to rest many doubts by addressing the endogeneity problem that led some researchers or criminologists to doubt the positive effect of increased police presence on the beats of a city.

In another evaluation study by Zimmring (2012), I asserted that police did matter in crime prevention. In the evaluation article, the researcher stated that the arguments that crime drops were because of socioeconomic factors were inaccurate (Zimmring, 2012). The researcher stated that police interventions were instrumental in the decrease of crime rates. The researcher posited that police could deter or prevent crime by their presence and by persuasion, thus reducing the opportunities for crime and arresting

wrongdoers. Zimmring disputed the theorists who posited that crime was the result of a collection of *root causes*, such as social injustice, racism, and poverty. The implication of the root cause theory did not place preference on the use of police to fight crime, but rather emphasized that crime would decrease if society addressed the root causes of crime. The root causes theory entails that police have little influence on crime, because they react to crime after it occurs. The root causes theory de-emphasized the role of police in crime prevention (Zimmring, 2012).

To validate the effect of police on society, Jenkins (2015) analyzed how the police were able to decrease crime in New York City. The researcher isolated three innovative approaches. The first approach was the idea of problem solving as a key role prevention, advanced by Professor Goldstein (1979). The second approach was the *broken windows* idea formulated by Professor Wilson (1982). The third approach was the emphasis on a new way of managing police resources and tactics, known as *comp stat*. The police department fused these three innovative ideas to enable the police to prevent crime in New York City.

A major contribution of this evaluation to the literature review is the position taken by the police department of New York, believing that police could have a negative effect on crime reduction or prevention if they focused on problem solving and ensured that they fixed any broken thing that could give rise to further crime (Jenkins, 2015). Police would also be required to follow a new method of managing police resources and tactics to succeed in crime prevention or deterrence. The evaluation qualified how much

police could matter if law enforcement implemented the ideas of problem solving, broken windows, and the new ways of managing police resources and tactics. If the police implemented these ideas, they could matter in crime prevention.

In this evaluation article, Jenkins (2015) did not address police patrols by themselves but rather addressed how the ideas in comp stat, broken windows, and the innovative management of police resources and tactics could help police patrols to be effective. The researcher asserted that during the last decade, crime rates in New York plunged. Murder declined by more than 70%, robbery by more than 60%, total violent crime offenses by more than 50%, and total property felonies by more than 60% (Jenkins).

Criminologists understood a key difference between this study and earlier studies, involving police patrol effectiveness research in terms of the importance of police in crime prevention or deterrence in the following four approaches (Jenkins, 2015). First, most researchers examined crime data but few examined crime, in relation to other factors. Second, while most researchers used homicides as the only outcome measure to examine factors that influenced crime rates, this research included an outcome variable that captured a wider spectrum of criminal activities: murder, rape, felonious assault, and robbery. Third, this research avoided the disadvantages of unsuitability comparison when using New York and the tendency not to compare New York at all. The researchers simulated the comparison groups. They used New York as 76 separate cities corresponding to 76 police precincts. They then viewed the variations economically,

demographically, and socially with police interventions in unison from 1993 to 2000. Fourth, this research differed from other analyses on the subject because Jenkins (2015) did not draw data solely from secondary sources to generalize about police practices. Some researchers have drawn from secondary sources without familiarity with the dynamics of police departments, the style and nature of the departments' police tactics, the methods of data collection, and the overall police departments' practices in the context of where the practices are rooted. The researchers ensured that they collected original data as well. The researchers posited that police did matter in crime reduction, as evidenced in New York in the 1990s, but that if the police were to affect the reduction of crime of any kind, patrols or other strategies had to be focused on a problem and concentrate their resources on hot spots where crime is concentrated.

Hot-Spot Policing

Braga (2006) conducted a meta-analysis of randomized experiments on the effectiveness of police patrols and other strategies to reduce crime, and posited that the experiments revealed statistically significant mean effects sizes favoring hot spot policing interventions. Braga measured for immediate spatial displacement and found limited results. One of the focused interventions that contributed in reduction of crime was the use of directed patrols in policing the hot spot areas. The other strategies used were proactive arrests and problems-oriented policing. The hot spots perspective in Braga's meta-analysis posited that police could reduce crime by focusing their limited resources

on the small number of places that often generate the majority of crimes, as asserted in Rosenfeld et al. (2014).

The development of technology has helped in crime prevention (Byrne & Marx, 2011). The police's use of crime mapping technology and computerized database studies revealed to police departments that crime clusters were usually in discrete small places, street blocks, apartments, and other specific addresses responsible for a high percentage of the total crime. The Minneapolis Hot Spots Experiments showed that about 5% of the addresses generated about 50% of all the calls from citizens for service (Rosenthal et al.).

The issues of displacement and diffusion effects were addressed. Five studies examined spatial displacements of crime into immediate surroundings of the targeted hot spots. None of the five studies reported significant or substantial immediate spatial displacement. In four of the studies examined, Braga (2006) found possible diffusion effects associated with the focused police interventions. Johnson, Guerette, and Bowers (2012) posited that researchers should also focus more on crime diffusion than crime displacement, even though hot spots with focused police strategies, such as directed patrols, may experience reported crime reduction.

In using terror alert levels to estimate the effect of police on crime, Klick and Tabarrock (2005) posited a credible estimate of the causal effect of police on crime, in spite of the need for more research for scholars and criminologists to determine the effect and magnitude for a generalization to other cities besides Washington, DC. Klick and Tabarrok confirmed the findings of Biderman (2012) that increased police on the streets

could have a significant influence on crime reduction. McCray (2002) disagreed with Biderman and argued that a programming error made Biderman's results to appear more precise that justified. McCray posited that only a stronger research design or perhaps heroic data collection could make researchers avoid making imprecise estimates of the causal effect of police on crime.

Klick and Tabarrock (2005) claimed to have developed a stronger research design than those utilized in similar research. The researchers posited that a new data source enabled them to make better estimates of the causal effect of police on crime (Klick & Tabarrock, 2005). Klick and Tabarrock used the high-alert times in DC and the police increase on the streets to break the circle of endogeneity and estimate the effect of police on crime. Many researchers have used the endogeneity problem to criticize the previous findings on the subject (Biderman, 2012).

Klick and Tabarrock (2005) addressed another critical issue better than previous research by using improved data. Many previous studies involved annual data subjected to an inherent trade-off, for instance a longer time series would improve the precision of estimates but would increase the possibility of omitted variables bias. Panel data, on the other hand, reduces the need for a long time series but raises the problem of endogeneity and omits variable bias in the cross sectional component. Klick and Tabarrock (2005) focused on a single city, Washington, DC, reduced the omitted variable bias in the cross sectional component.

Klick and Tabarrok (2005) also used the easily identifiable and clearly exogenous shock to examine the effects of police on crime. The importance of this research for the study was the treatment the researchers gave to the terror alert level that was turned on and off repeatedly during their sample that enabled the researchers to solve the problem of endogeneity. The researchers also used daily crime data that made the treatment window short (Klick & Tabarrock, 2005). The treatment window lasted days and weeks, making the results less likely to be because of other factors and enhancing the credibility of the findings. Klick and Tabarrock showed that a 50% increase in police presence led to 15% reduction in crimes.

Klick and Tabarrok's (2005) findings showed a marked difference from Levitt (1997), because they were able to show a credible estimate of the causal effect of police on crime. The difficulty posed by Klick and Tabarrock, however, was to determine if this effect and its findings could be applicable for other cities. The researchers posited that in principle, their design that used terror alert changes as exogenous shocks to police presence was good and that other researchers could use daily crime data in analyses of crime patterns in other metropolitan areas to make a determination of the effect of increased police or police patrols on crime (Klick & Tabarrock, 2005). The findings in the research showed a marked difference from the research previously discussed. Klick and Tabarrok stated that violent crimes showed no response to increased police patrols on high alert days. The large declines in crime were in automobile thefts and thefts from automobiles.

Another major difference between previous research and the research of Klick and Tabarrok (2005) on the influence of more police patrols on crime was the focus on the percentage by which increased police patrols can diminish crime. The researchers decided to focus on cause and effect and assumed that if increased police patrols could reduce crime, they wanted to know the size of the effect of the reduction or deterrence (Klick & Tabarrok, 2005). Klick and Tabarrok determined the percentage by which police patrols could deter crime in terms of costs and benefits to ascertain whether employing more police for patrols would be beneficial to a city. Police jurisdictions spent a lot of money in previous years and it would be worthwhile for them to determine whether taxpayers' money was spent well by calculating the benefits against the costs.

Klick and Tabarrok (2005) also posited that their research was a natural experiment. The researchers contended that to separate cause and effect and to determine whether more police on the streets would reduce crime would require a natural experiment, an event that changed the number of police officers for reasons that had nothing to do with the crime rates (Klick & Tabarrok, 2005). Klick and Tabarrok compared the crime rates before and after the terror-alert to determine the effect. Using the changes in the terror-alert level provided the kind of natural experiment they needed, because the shifts in police deployment were large enough to made effects easier to determine. The number of police officers on patrol fluctuated during days and weeks, rather than months or years. The authors did not observe any displacement because crime decreased throughout the city, Washington, DC (Klick & Tabarrok, 2005). Klick

and Tabarrok posited that other researchers could replicate their research in other cities since the terror alert system operated nationally.

Groff et al. (2013) conducted a study to determine causal effects of more police on crime. Marvell and Moody (1996), Ratcliffe and Breen (2011), and Kleck and Barnes (2014) found either a positive effect of police presence on crime or no relationship between the variables, police and crime. These findings were contrary to Becker (1968), whose theory contended that crime would decrease when police presence increased.

Addressing the Endogeneity Problem

The researchers who found a positive effect of police presence on crime faced the endogeneity problem because of the identification of crime and the presence of the police (Kelman, Hong, & Turbitt, 2013). A likelihood existed that a city would hire more police officers because the crime rate increased. Areas beset by high crime would have more police than areas with low crime rates; such a situation would introduce a positive bias in the police coefficient in a crime regression. Researchers in the field of study had the central challenge of breaking the endogeneity problem if they were to isolate causal effects of police on crime (Groff et al., 2013). The researchers presented a different approach from Levitt (1997) to estimate the causal effect of police on crime.

When terrorists attacked a synagogue in Buenos Aires, where 85 people were killed and 300 were wounded, the federal government assigned police protection to every Jewish and Muslim building in the country. Groff et al. (2013) presumed the institutions exogenous in a crime regression because of the geographical distributions and the terrible

crime to constitute a natural experiment in which the simultaneous identification of the crime and the presence of the police could be broken. The researchers found that city blocks that received police protection experienced significantly fewer car thefts than the rest of the neighborhoods (Groff et al., 2013). The effect was large. Car thefts fell by 75% in the blocks with the protected institution. The researchers, however, concluded that the effect was local as they found no evidence that police presence in a given block reduced car theft one or two blocks away from the protected buildings (Groff et al., 2013). Groff et al. also posited that their estimates were not appropriately interpreted as the causal deterrent effect of police patrols on car crime. The experiment of Groff et al. (2013), unlike others previously discussed, did not address the problem of the displacement of crime. The researchers argued that it was possible that car thefts were displaced in a way they were not able to measure (Groff et al., 2013). The effect of police on crime could have been smaller than their estimate suggested.

The experiment of Groff et al. (2013) is critical to the research because the researchers broke the endogeneity challenge, which was a barrier in finding a negative causal effect of police on crime. The findings were similar to the research of Klick and Tabarrok (2005), because both occurred in a naturalistic setting. Levitt (1997) developed a different approach to break simultaneity by using instrumental variables, which McCray (2002) criticized. Groff et al. decided to use a natural and randomized experiment. This experiment strengthened the position of those scholars who posited that more police on the streets had a negative effect on crime. Whereas Levitt found a large negative and

significant effect of police on violent crime, Groff et al. found a negative effect of police on car thefts or property crime.

Among the researchers who found a relationship between police levels and crime were Kovandzic and Sloan (2002). Kovandzic and Sloan found that prior researchers who posited that police levels had little effect on crime rates were methodologically flawed. The researchers examined whether police levels had any effect on crime rates. Kovandzic and Sloan subjected the data to a multiple time series design and revisited the police crime relationship using a sample of large cities. The study results revealed that increased police levels reduced most types of crime at the county level (Kovandzic & Sloan, 2002). The findings of Kovandzic and Sloan's research challenged the assertion of Cameron (1988), who reviewed 22 publications on the relationship between police levels and crime.

Marvell and Moody (1996) also reviewed 36 published studies in which prior researchers examined the effect of police levels and crime rates. The analysis confirmed that in 10 of the 36 studies, the researchers found an inverse relationship between police levels and crime rates; as police levels increased, crime rates decreased (Marvell & Moody, 1996). The relatively consistent findings by prior researchers strengthened the theory that no relationship existed between police levels and crime rates. Critics argued that police were not directly involved in the handling of crime (Bayley, 1985, 1994; Bensen, 1984).

O'Donnel (2011) posited that the assumption that more police decrease crime justifies the hiring of additional police and the building of more prisons. In their research, Kovandzic and Sloan (2002) disagreed with the assumption posited by some researchers that increased police levels did not decrease crime. The researchers also disagreed that police departments or policy makers believed that increased police or police patrols decreased crime to justify the hiring of more police (Kovandzic & Sloan, 2002). Kovandzic and Sloan criticized prior researchers for their inability to mitigate specification problems, including simultaneity and the incomplete control variable. Marvell and Moody (1996) presented a more appropriate methodology that solved the specification problems that led prior researchers to assert that no relationship existed between increased police levels and crime. Kovandzic and Sloan (2002) used the Granger test to explore causal direction and to determine the ability of one variable to predict another. Researchers usually use the Granger test when they were unable to specify the structural model.

Specifically, Kovanadzic and Sloan (2002) used the Granger test to examine causal effect, as the test identified instantaneous causation because the value of the current year of the independent variable serially correlated with its 1-year lagged value. The researchers accomplished this by regressing police levels on lags of themselves and on lagged crime rates (Kovanadzic & Sloan, 2002). The results of the research showed strong evidence that increased levels of police patrols led to lower crime rates. The results showed that a 10% increase in police levels lowered crime rates by 1.4% over

time (Kovanadzic & Sloan, 2002). The findings of Kovandzic and Sloan were consistent with the findings of Marvell and Moody (1996), who suggested that local government leaders make decision regarding the firing of police officers based on the overall fluctuation in crime rate than in specific fluctuation data. The findings of the research advanced more evidence that statistical models in prior police crime research suffered from simultaneity bias. The simultaneity bias that prior research did not address with appropriate procedures led many researchers to believe that increased police levels had no effect on lowering crime.

Telep and Weisburd (2012), in a review, asserted that increased police levels decreased or deterred crime. Telep and Weisburd stated that deterrence effect was one of the rationales behind the proposition that police could reduce crime. Becker (1968) popularized the proposition of deterrence that Beccaria and Jeremy Bentham introduced. From a basic perspective, police presence would deter crime because it raised the probability of the offender being caught. Telep and Weisburd disagreed with prior researchers who posited that little or no evidence demonstrated that more police could reduce crime. Telep and Weisburd criticized those studies for failing to address the endogeneity problems. Marvell and Moody (1996), Nagin (1998), and Levitt (2002a, 2002b) have stated that the positive correlations that some researchers found may probably be the result of confusion between correlation and causation.

Researchers needed instrumental variables that correlated with police presence but uncorrelated with the error term that must affect crime only through the presence of

police (Levitt, 1997). Telep and Weisburd (2012) estimated the effects to show that changes in state taxes had an effect on the levels of local police as illustrated in Figure 1.

Figure 1. The effects on local police from changes in state tax rates.

Telep and Weisburd (2012) compared the time series data on crime rates, police numbers, and sales tax rates which showed that significant decreases in both violent and property crimes after 1990 correlated with the increase in police and sales taxes. Telep and Weisburd's research findings further reinforced the position of researchers who maintained that prior researchers failed to find a correlation between increased police levels and crime reduction because they did not address the problem of simultaneity (Kovandzic & Sloan, 2002; Levitt, 2002 a; Marvell & Moody, 1996; Nagin, 1998).

Through a British Crime Survey, Vollaard and Hamed (2012) found that increased police patrols had a significant effect not only on property crime, but on violent crimes as well. In the survey, the researchers posited that the crime data from the survey did not suffer from measurement errors that earlier research suffered from, especially from the propensity by researchers to record violent crime that was susceptible to changes in the number of police than of police statistics on property crime (Vollaard & Hamed, 2012). In their analysis of the collected data, Vollaard and Hamed found that the

estimated effect of police on violent and property crime was similar in size as a 1% increase in police resulted in a 0.7% decrease in crime. The findings are similar to those in earlier studies in the United States. The decrease of crime in the 1990s in the United States was partly because of the increase in the number of police or police patrols (Donahue & Ludwig 2007; Gill et al., 2014). Previous researchers, including Corman and Mocan (2000) and Klick and Tabarrok (2005), also found a significant effect of increased police patrols on property crime.

While some researchers found a significant negative effect of increased police on property crime, Vollaard and Hamed (2012) found a significant negative effect of increased police on both property crime and violent crime. The researchers posited that the insufficient evidence in previous studies was based on the data collection methods. Vollaard and Hamed posited that property crimes tended to be recorded more often than violent crimes, because citizens more often report property thefts to the police than crimes of violence. Besides the violent crime of homicide, police less frequently recorded a violent crime than property crime. Incomplete police records, victim reporting, and police recording biases compounds the effect of police in crimes. Vollaard and Hamed stated that the inability of prior researchers to address the reporting and recording biases between property crimes and violent crimes led to the conclusion that increases in police had no effect on violent crime (Vollaard & Hamed, 2012).

In their research, Vollaard and Hamed (2012) addressed the measurement error that resulted in biased estimates. The approach made a difference that resulted in finding

a significant negative effect on violent crime by police increases, which was relevant to this study. The researchers based their analysis on data at police force area levels. Vollaard and Hamed posited that robust effect of increased police on violent crime did not occur in the studies of Corman and Mocan (2000, 2005) and Levitt (2002). The research was critical to my study because it emphasized the importance of addressing the measurement error that was central and ignored by prior researchers when they studied the effect of increased police or police patrols on crime. Vollaard and Hamed used crime survey data rather than relying primarily on police recorded data for the same set of police force areas and for the same time. The British Crime Survey became one of the recent emerging studies that provided evidence that the effect of increased police or police patrols had a significant negative effect on violent crime as well as on property crime (Vollaard & Hamed, 2012).

Draca et al. (2008) used terrorism-related events to examine the police-crime relationship, because terror attacks would often bring about increased police presence in identified places. The researchers considered the police-crime relationship before and after the terror attack in a metropolitan area (Draca et al., 2008). The study was similar to that of Groff et al. (2013) and Klick and Tabarrok (2005), because they also used terrorism-related events in their research. The application of the research was, however, more general than the previous two studies by Groff et al. and Klick and Tabarrok. Draca et al. covered a large metropolitan area, and the scale of the attack provided the researchers a valuable setting to examine the relationship between police and crime; it

provided a natural setting that the other two researchers had. The researchers also had accurate data on police deployment that they used to identify the magnitude of the causal effect of police on crime (Draca et al., 2008). Draca et al. were able to use the crucial aspect of the "natural" setting to identify a causal effect and to establish the exclusion restriction.

The findings of Draca et al. (2008) were different from previous researchers (Kleck & Barnes, 2014; Marvell & Moody, 1996; Ratcliffe & Breen, 2011), who did not find any relationship between increased police or increased police patrols and crime reduction. Draca et al. posited that the failure in prior research to find a relationship between increased police or increased police patrols and reduction in crime was because of those researchers' inability to identify the direction of the relationship between the two variables. Draca et al. posited that police increases had negative effects on property and violent crimes, finding that the scale of police deployment during the terror attack was greater than the highly localized responses previously studied. The police keeping their force levels constant had a large effect on crime. Clear evidence of the timing and location of reductions in crime coincided with the increase in police deployment (Draca et al., 2008). The findings were contrary to Hart and Miethe (2015), who argued that no matter how police were deployed, police presence would not deter crime. The increase of police patrols by 30% in the 6 weeks following the July 7, 2005 bombing made crime fall significantly in other areas of the city under investigation (Draca et al., 2008). Draca et

al. estimated an elasticity of crime with respect to police of about -.3, so that a 10% increase in police activity reduced crime by about 3%.

The researchers did not find strong evidence of temporal or spatial displacement effects because of the 6-week police intervention. The research was relevant to this study because the researchers showed that an increased number of police or increased police patrols on the streets of an urban area could reduce property crime and violent crime. The researchers found that increased police patrols could reduce crime and addressed the problem of endogeneity that posed difficulties in establishing a relationship between police and crime, as found in the prior studies (Marvell & Moody, 1996; Ratcliffe & Breen, 2011).

Vollaard (2005) observed that many policy makers based their decisions about police budget primarily on anecdotal evidence regarding the effects of more police in crime rather than the results of systematic research. Vollaard analyzed the effect of additional police on the chance of becoming a victim of crime and nuisance during 1996–2003 in a metropolitan area. After the analysis of changes in police personnel and trends in crime and nuisance, the results indicated that: (a) police patrol is more effective in urban areas, (b) increase in the number of police decreases crimes, and (c) more police in an area might lead to criminals fleeing to other places (Vollaard, 2005).

Vollaard's (2005) based the approach to isolate the effect of rising police levels from many other factors on the premise that more police personnel decrease the rate of crime. Vollard focused on the growth rates of police and not the historically grown levels

of police and crime in a region. The researcher also focused on the differences in police personnel growth between regions and estimated the crime trends in those regions. Vollaard used the approach or design to identify the effect of police on crime. The researcher avoided the use of the budget formula that could allow a third a third factor to obscure the effect of police on crime (Vollaard, 2005). Policy makers and law enforcement distribute most of the police budget among police forces using the budget formula. Vollaard studied various characteristics, such as number of shops and length of streets, to determine the relative need for police resources. If the budget formula shifted the growth in police resources to those areas with the highest crime trends, a strong possibility would exist to underestimate police effectiveness, because in such a situation, police resource problems would lead to a positive relationship between growth in police personnel and increases in crime.

By analyzing the events from 1996–2003, Vollaard (2005) conducted an uncontrolled experiment to answer the basic question about police effectiveness. The researcher focused on whether the decline in crime was the result of police or better labor market opportunities. Vollaard found that the marked expansion in police personnel took place concurrently with the aggregated crime trends. Police forces increased by 13,000, a growth of about 30% (Vollaard, 2005).

Braga, Hureau, and Papachristos (2014) evaluated the Operation Ceasefire, Los Angeles (2000) and found that the use of increased patrols in the area of Hollenbeck where violent gangs were most active brought about a reduction in violent crime. The

use of increased police in Boston and Los Angeles was successful in spite of the geographical and racial differences (Braga, Hureau, & Papachristos, 2014). In Boston, the gangs that perpetrated the violence were mostly African American; in Los Angeles those responsible for the violence were mostly Latino. The gangs in Los Angeles were bigger and more entrenched than in Boston (Braga et al., 2014). Another notable difference between these two cities lay in the population difference. Los Angeles had a population of 3,849,378 (U.S. Census Bureau, 2006) and Boston had a population of 589,141 (U.S. Census Bureau, 2000). In spite of the differences in population, ages of gangs, and entrenched levels of violence in both cities, increased police patrols succeeded in reducing violent crime in Boston, such as homicide (63%; Braga et al., 2014).

In Los Angeles, increased police patrols and intensive law enforcement in the selected five police reporting districts of Boyle Heights where the gangs, Cuatro Flats and TMC, were most active, saw a decline in the suppression stage, but the decline was stronger in the deterrence stage by 37% overall and 24% in the rest of Boyle (Tita et al., 2005). The comparison area outside of the five districts that did not have increased police patrols only had a 3% decrease in violent crime. Operation Ceasefire (2000) provided relevance to this study because it affirmed that increased police patrols in a city can reduce violent crime, contrary to some researchers argued that increased police patrols do not reduce violent crime. Tita et al. (2005) demonstrated that the size of the population and the entrenched nature of violent crime in a city do not deter success if the operations of law enforcement are focused.

Other Factors That Affect the Rates of Violent Crime

Unemployment

Unemployment has long been one of the factors associated with crime (O'Donnell, 2011). Becker (1968) and O'Donnell (2011) found that the effect of unemployment on crime is quantitatively significant. Papps and Winklemann (1999) explored the contentious issue and found some evidence of significant effects of unemployment on crime. The effects were for both total crime and for some subcategories of crime. Box (1987) reported that out of 35 reliable studies that dealt with the topic, researches of 20 studies found a positive relationship between unemployment and crime; the others found no relationship. Small and Lewis (1996) found strong support that crime and unemployment are linked, with unemployment causing crime. The type of data prior researchers used to obtain the empirical literature on the topic for was based on aggregate time series data and aggregate cross-section data, which have affirmed a causal relationship between unemployment and crime (Brenner, 1978; Chapman, 1976; Levison, 1976; O'Donnell, 2011). Entorf and Spengler (1998), however, found that unemployment had a small and often insignificant relationship by using a regional panel study. When Papps and Winkelmann revisited the research regarding the relationship between unemployment and crime, they used regional panel data, regressing crime rates on unemployment rates by using fixed and random code effects. The researchers found a causal relationship between unemployment and crime (Papps & Winkelmann, 1999).

Education

Another factor considered to have an effect on crime is education. Machin, Marie, and Vujic (2011) found that schooling significantly reduced the probability of incarceration. The researchers concluded that the differences in educational attainment between Black and White men is an explanation for the 23% gap of the Black-White incarceration rates after analyzing the FBI data on arrests for different types of crime (Machin, Marie, & Vujic, 2011). Machin et al. also found that the biggest effects of education on crime were linked to murder, assault, and motor vehicle theft.

Machin et al. (2011) delineated a number of factors, such as patience, to acquire an education, development of positive social networks, moral values taught in schools, and the probability of higher wages from acquiring labor market skills through education to contribute to a correlation between education and crime. This analysis centered on a human capital approach; that an accumulation of human capital during a lifecycle would explain why those adults who had developed formal labor market skills would be averse to criminal activity, especially for violent crimes that usually carry a longer incarceration period (Machin et al., 2011). Gould et al. (2002) also estimated the effects of low skill wages on violent crime to be larger than for property crime. Lochner (2007) stated that higher wages raise the opportunity costs because the increase is more costly for persons with better education or better labor market opportunities to engage in criminal activity than those with little or no education or labor market opportunities.

Some researchers do not agree to a causal link or any significant relationship between education and crime. Kleemans (2012) asserted that neither years of schooling nor the receipt of a high school diploma had any significant effect on somebody's criminal activity. Tauchen et al. (1994) also found no significant relationship between education and crime.

Homeownership

Homeownership is another factor believed to have a negative effect on crime. Ni and Decker (2009) used county-level census data and Uniform Crime Reports for the United States to determine the influence that homeownership had on crime rates. The researchers controlled for income's effect on homeownership rates and found that homeownership had a strong and statistically significant negative effect on property crime and violent crime (Ni & Decker, 2009). Ni and Decker asserted that increases in homeownership rates brought about a reduction of criminal activity. Ni and Decker also stated that with estimates putting the cost of fighting criminal activity at more than 5% of U.S. GDP (Cooter & Ulen, 2000), it would be desirable to pursue the promotion of homeownership because of its negative effect on crime.

Cost of Living (Inflation)

Researchers have ascertained inflation to be one of the determinants of aggregate property crime (Seals & Nunley, 2007). Rosenfeld (2014), Torruam (2014), and Tamayo, Chavez, and Nabe (2013) found a causal relationship between inflation and crime that could be found in the crime literature in various Western, Eastern, and Latin

American countries. In a study to identify the economic factors that are responsible for an increase of crime in Pakistan, Gillani et al. (2009) found that major economic factors, such as unemployment, inflation, and poverty, are related to the increase of crime in Pakistan. Gillani et al. also found that the effect of inflation is not only on property crimes, but also has a positive effect on robbery, which is a violent crime.

Gillani et al. (2009) used a Granger causality test on the assumption that past events would not be influenced by events occurring in the present or in the future. The researchers further assumed that if event X happened before event Y, only event X could cause event Y (Gillani et al., 2009). To determine the effect of inflation on aggregate crime rates, Seals and Nunley (2007) used data from the FBI's UCR for years 1959 to 2005. While previous researchers based their analyses on aggregate unemployment, Seals and Nunley based their analysis on inflation. The researchers hypothesized that in an economic environment with unstable prices, people have an added incentive to use illegal ways to acquire goods (Seals & Nunley, 2007). Seals and Nunley contended that since rising prices devalued money, property crime would be an attractive way of making up for what was lost through inflation. In addition, most of the increase in crime between 1960 and 1970 was largely a result of inflation (Seals & Nunley, 2007).

Unemployment Compensation

Rossie, Berk, and Lenihan's (1980) early study examined the Transitional Aid Research Project (TARP), based on the idea that crime offenders are sometimes released but do not have adequate sources to be able to adjust in reentering the society. To

compensate for this, TARP put forward a limited amount of income for a limited period. Rossie et al. found that while the unemployment compensation can reduce recidivism rates, it can affect one's incentive to work negatively. The payments therefore do not increase recidivism rates, but the payments can perpetuate unemployment. In fact, the researchers claimed that the TARP experiment policy can lead to significant support to an income-maintenance strategy to reduce arrest recidivism among released prisoners.

Summary and Conclusion

The literature review helped determine whether increase in police or police patrols reduce crime or violent crime, and showed mixed outcomes. The Kansas City Preventive Patrol Experiment (1974) found that police patrols had no effect on crime and had no effect on making citizens feel safer. The Newark, New Jersey Foot Patrol Experiment (1981) found that police patrols had little effect on crime rates. The experiment, however, found that citizens felt safer in areas with foot patrols. The Flint Foot Patrol Program (1981) isolated an effect of police patrol on crime and found that crime levels reduced by 9% because of police patrols. The researchers of the program found a significant level of satisfaction among the residents for police services. This literature review showed a progression in the findings from 1974 to 1981; from police patrols having no effect on crime to having little effect on crime and to having an effect by reducing crime by 9%.

The Kansas City Gun Experiment Project (1993) found that police patrols had an effect on violent crime (gun violence), and the seizure of more guns by police resulted in

a 49% decrease of gun violence. The researchers of the experiment estimated a significant decrease in homicide rates. Directed police patrols had a significant negative effect on gun violence. Citizens were less fearful of crime in the target area but not in the comparison area. Studies from 1997 had different findings. The Indianapolis Directed Patrol Project and Levitt (1997) found that police patrols reduced violent crime significantly. Levitt, however, found that police patrols had a smaller effect on property crime

The literature review assisted in establishing the researchers who did not find a correlation or causal effect between increase in police or police patrols and crime reduction, because of flaws in their methodological approaches. Prior researchers failed in finding solutions for the endogeneity problem that led them to assert that positive correlations existed between police and crime (Kelman, Hong, & Turbitt, 2013; Levitt, 2002a, 2002b; Lin 2009; Marvell & Moody, 1996). Recent researches, such as Vollard (2005), Draca et al. (2008), Zimring (2012), Vollard and Hamed, (2012), and Gill et al. (2014), found a causal effect between increases of police or police patrols and crime reduction. These studies presented a significant negative effect of increased police or police patrols on crime reduction.

In 2001, Zimring (2012) and Kovaudzic and Sloan (2001) found that police patrols had a negative effect on violent crime and on robbery, burglary, and larceny, but that police patrols had little influence on homicide rates. Groff et al. (2013) found that police patrols had no effect on violent crime but had a large negative effect of 75% on

property crime. Gill et al. (2014) isolated police as one of the key factors that brought about the decline of crime in the 1990's, and that about one-fifth of the overall decline of crime was because of increases in police or police patrols. Telep and Weisburd (2012) posited that increased police numbers or police patrols reduced crime significantly. The Pendleton Crime Reduction Project (2005) found that directed police patrols significantly reduced crime in the target areas. Draca et al. (2008) asserted that increased police patrols reduced crime, including violent crime, by 11%. Chen and Keen (2014) stated that increases in police had a significant negative effect on property crime, murder, and robbery but had no effect on rape and assault.

After a perusal of the literature regarding the effects of police patrols on violent crime, I highlighted the studies that did not show a correlation or causal effect between police or patrol increases and crime reduction was because of flaws in their methodological approaches. Prior researchers failed in finding solutions for the endogeneity problem that plagued many researchers studying the subject, asserting that the relationship between police increase and crime was positively correlated (Chalfin & McCrary, 2013; Rosenfeld & Fornango, 2014; Vollard & Hamed, 2012). Other recent researchers (Braga & Weisburd, 2011; Nagin, 2013; Telep & Weisburd, 2012) addressed the problem of endogeneity and found a causal effect between police or police patrol increases and crime reduction. The literature review also showed that more recent studies established that a correlation existed between increased police patrols and a decrease in crime. A causal effect was also established that increased police patrols caused a

decrease in crime. The studies did not only find a negative effect of police on crime, but also established a significant negative effect on crime. These researchers found a significant negative effect of increased police on crime. These findings are because of better methodologies or research designs utilized by researchers.

For the literature review regarding the other factors or variables—home-ownership, unemployment, years of education, cost of living (inflation), unemployment compensation—a large agreement exists that these factors are related to crime. For homeownership, Cassidy, Inglis, Wiysonge, and Matzopoulos (2014) found that increases in home-ownership had a strong and statistically significant effect not only on property crime, but on violent crime as well. Some researchers believe that years of education are related to crime. Fella and Gallipoli (2014) found that the more years of education a person had, the more averse he or she would be to crime, including violent crime. The researchers asserted that the gap in percentages of incarceration between Blacks and White (23% higher for Blacks) was because of levels of education, which were higher for Whites than Blacks (Fella & Gallipoli, 2014).

I analyzed the independent variables by using correlation and multilinear regression analysis (police patrols, unemployment, cost of living [inflation], homeownership, years of education, and unemployment compensation) to determine the relationship between the independent variables and the dependent variable of violent crime in terms of the strength and direction of the relationship (Kruger, 2011). From the examination, analysis, and synthesis of the literature review, I established that in more

recent studies, researchers have leaned toward the assumption that more police patrols on the streets of cities are related to and reduce violent crime. This assumption needed to be empirically tested. The next chapter details the research method (research design) to test the assumption by using the increase in police patrol with the other variables (factors), such as years of education, cost of living (inflation), unemployment, home ownership, and unemployment compensation, to examine the relationship of each factor with violent crime. The study followed a nonexperimental, quantitative correlational research design. The choice of design for the study supported the purpose of this research study, which was to relate the independent variables (individually and collectively) to the dependent variable. The techniques or tools of analysis were a correlation and multilinear regression. By using a correlation analysis, I provided a mathematical measurement of the strength of the relationship between the six independent variables in the study and the dependent variable of violent crime. Using a multilinear regression analysis helped in the identification of the way two or more variables were related (Kruger, 2011).

Empirical data regarding the strength of the relationship, positive or negative, between the independent variables and the dependent variable of violent crime will be useful to lawmakers, policy makers, and policy analysts because it will guide them in their various ventures. Since the use of regression allows for the estimation of the value of one variable from the value of another, the decision maker can tell how an independent variable may or may not produce an observed change in a dependent variable (Kruger, 2011), information which is critical when allocating resources to fight crime.

Chapter 3: Methodology

Introduction

The purpose of this study was to examine the relationship between six independent variables (police patrols, unemployment rate, level of education, home ownership, cost of living (inflation), and unemployment compensation) in an aggregated composite of seven selected major cities with the dependent variable, the rate of violent crimes. The chapter includes the following sections: research design and rationale, methodology, threats to validity (including ethical procedures). The chapter ends with a summary.

Research Design and Rationale

Through this study, I sought to examine the six identified independent variables and the nature of their relationship to the dependent variable (rates of violent crimes) as well. The data analysis involved use of multiple linear regression analysis to determine which (if any) of the independent variables were statistically significant predictors of the dependent variable in an aggregated sample based on data from seven cities across the United States. The independent variables were (a) the rate of police patrols, (b) unemployment rate, (c) years of education, (d) home ownership, (e) cost of living (inflation rates), and (f) unemployment compensation.

I used a nonexperimental approach for this study because the purpose was to determine the nature of the relationship between the independent variables individually with the dependent variable. In addition, I aimed to ascertain which, if any, of the

independent variables were statistically significant predictors of the dependent variable during the time period 2000–2010, based on aggregate data for seven cities, as described in Chapter 1. Therefore, no intervention was necessary in examining this relationship because I sought to gather information regarding the naturalistic environment and past occurrences. In addition, a nonexperimental correlational design was required, since the study involved seeking answers to the success and failure to control violent crime rates through increases in police patrols and other factors.

Data collection occurred from several U.S. cities, namely Boston, MA; Indianapolis, IN; Kansas City, MO; Los Angeles, CA; Philadelphia, PA; Pittsburgh, PA; and Washington, DC. I retrieved electronically annual violent crime statistics from the UCR statistics made available by the FBI's website. Violent crimes were reported in aggregate, comprised of murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault. The FBI website also lists the number of police officers for each city. Note that civilian law enforcement employees were not included in this figure. I retrieved the unemployment rate from the Bureau of Labor Statistics (BLS), and retrieved the average years of education, home ownership rates, cost of living (inflation), and the weekly unemployment compensation from the U.S. Census Bureau website. Annual data from years 2000 to 2010 were retrieved for all the variables studied.

A correlation research design provides the ability to examine the relationship of variables (Ary, Jacobs, Sorensen, & Walker, 2013). Through this study, I sought to determine the relationship of the six factors stated with violent crime rates. Determining

the possible relationships of these variables with violent crimes was the major objective of the study, but the possible effect of the other relevant factors were not disregarded or removed from the correlational analysis. Correlation essentially refers to an interest in determining whether a statistically significant positive or negative linear relationship exists between two variables (Chatterjee & Hadi, 2015). The purpose of the study was to determine whether any statistically significant relationships existed between the dependent variable and independent variables. A statistical correlation design is appropriate for analysis regarding relationships among and between variables (Cohen, Cohen, West, & Aiken, 2013; Salkind, 2006).

There are two types of correlation, positive or negative (Cohen et al., 2013). A correlation can range from -1.0 (perfect negative) to 0 (no relationship) to +1.0 (perfect positive). A positive correlation between the variables occurs when one variable increases and the other variable also increases, whereas a negative correlation results when one variable increases and the other decreases; the opposite would also hold true.

The quantitative research design was appropriate because of the emphasis on examining whether variables are related to each other (Pickard, 2012). The research questions for this research study also required descriptive statistics of the study variables and an analysis of the direct relationship between two variables, which could not be conducted in a qualitative analysis. Responses provided for open-ended questions, the typical response in qualitative studies, have to be coded and themes or trends in the responses have to be determined. A qualitative design did not apply because the study

only involved use of scaled or nominal data. The independent variables of interest were police patrols, unemployment rate, years of education, home ownership, cost of living (inflation rates), and unemployment compensation. The dependent variable was violent crime rates.

In contrast to qualitative research in which variables emerge from the data, all of the study variables were known in advance and hypothesized directional relationships existed based upon the extant research. Qualitative research is applicable in small populations for in-depth exploration (McMillan & Schumacher, 2014). Therefore, it was not applicable, since this research study involved generating conclusions from a big sample size ($N \geq 798$ violent crimes).

Methodology

Population

The population for this study included cities in the United States that have experienced high levels of violent crime and have increased police patrols in their respective cities, which include Washington, DC; Indianapolis, IN; Philadelphia, PA; Boston, MA; Kansas City, MO; Los Angeles, CA; and Pittsburgh, PA. Power is a function of effect size and sample size (Richardson, 2011). If power is set at .80, and effect size at .20, then the desired sample size can be calculated. The computation of the sample size is necessary to determine the statistical power for the study and to check whether the sample size is sufficient to provide a reasonable power. This was an

important consideration for the findings of the research study to become reliable and conclusive to all cities.

Sampling and sampling procedures. A researcher must obtain the recommended number of samples based on the computation in a power analysis. When calculating the sample size for the study, I took three factors into consideration: (a) the power of the study, (b) the effect size of the study, and (c) the level of statistical significance. The effect size is a measurement of the strength in the relationship between the independent and dependent variables (Richardson, 2011). In most instances, the effect size is defined as small (r = 0.10), medium (r = 0.30), or large (r = 0.50; Cohen, 1977). The power of the study refers to the rejection of Type II error, which is the rejection of a false null hypothesis. For the study, power was set at 80% (Keuhl, 2000). The last factor of importance is the level of significance. The alpha level is the probability of a Type I error, or the probability of rejecting the null hypothesis given that the null hypothesis is true. Usually alpha level is set to 0.05 or 95% confidence interval (Draper & Smith, 2014).

The sample size was calculated using G*Power, a general power analysis program, or a statistical tool specifically used to determine sample size, wherein the calculation is based on the use of a power of 0.80, a medium effect size (r = 0.15), and on a level of significance equal to .05. Using the statistical test of multiple linear regressions with six predictors of the dependent variable of violent crime rates, the resulting

computation concluded that the minimum sample size should be 114, which exceeded the 30 samples needed to assume for normality.

Sampling plan. Event sampling methodology allowed me to study ongoing events that vary across or within time. Event sampling method (ESM) is a form of sampling method that enables researchers to evaluate ongoing experiences and events that differ across and within days in its naturally-occurring settings (Pejovic, Lathia, Mascolo, & Musolesi, 2015). The type of sampling plan selected was appropriate for studies that required secondary data. Secondary data are readily available data in historical records, database, and documents. Because the study included historical data, I aimed to incorporate this variability to examine and determine whether a relationship existed between the independent variables and the dependent variable. The study involved annual data retrieved from years 2000 to 2010 for all of the variables studied.

For each independent variable, the frequency of data collected was at a monthly rate. The dependent variable, violent crime rate, also was collected at a monthly rate. All data collected occurred at a uniform monthly rate to allow me to examine each independent variable in relation with the dependent variable.

Data Collection

The instrument used in the data collection was secondary data obtained from historical records in database and documents. The study did not involve use of surveys and questionnaires. Data were collected for seven U.S. cities outlined earlier. I retrieved annual violent crime statistics from the Uniform Crime Reporting (UCR) statistics, made

available through the FBI website. Violent crimes were aggregated from the following categories: murder and non-negligent manslaughter, forcible rape, robbery, and aggravated assault. The FBI website also provided the number of police officers for each city. Note that civilian law enforcement employees were not included in this figure. The BLS website provided the unemployment rates, while the U.S. Census Bureau website provided the average years of education, home ownership rates, cost of living (inflation), and the weekly unemployment compensation information for each city.

Based on a power analysis conducted using G*Power, the minimum number of observations required for the study to have a power of 0.80 was a 114 sample size for each of the seven cities. This was the sample size recommended by the creators of G*Power if the study involves a statistical power of 0.80. Increasing the power of the study to 0.95 would increase the minimum number of observations to 166. This means that with a power of 0.80, 114 data points would be necessary while for a power of 0.95, 166 data points would be required (Faul et al., 2007). Given the completeness of the sample of this study, and since a power of 0.80 has been shown to be sufficient for event studies, this study had a target power of 0.80. Additionally, 114 samples of violent crime cases in each of the seven cities were enough to have a more reliable and valid measure of study variables, since the randomness of the data were captured by the many data sets.

I collected the variables of violent crime rate and the six independent variables that affect the dependent variable, which represented each city included in the sample. This was to ensure that the findings represented various scenarios in proving that

increasing the number of police patrol and other relevant variables in a city would result in a decrease in the amount of violent crime or not. The minimum number of 114 violent crime cases for each city based on the G*Power analysis included all of the observations for each city starting from year 2000 to 2010. I expected that during these periods of investigation, no city would be dropped from the data set for not meeting the requirements of 10 years of data. I collected, collated, downloaded, and imported the raw data into a computer spreadsheet, Microsoft Excel. Each city received a unique identification number. Each column represented one of the six independent variables and dependent variable for each month of the 10 years.

Operationalization of Constructs

Data Analysis Plan

Data were entered into SPSS version 22.0 for Windows for analysis. I conducted descriptive statistics on the data sample's characteristics, and frequencies and percentages on categorical data. I conducted means and standard deviations on continuous data, including number of violent crimes and the six city characteristics: number of police patrols, unemployment rates, years of education, home ownership rates, monthly cost of living (inflation), and unemployment compensation rates. The data analysis involved examination of archival data between 2000–2010 from seven cities (Indianapolis, IN; Boston, MA; Philadelphia, PA; Kansas City, MO; Pittsburgh, PA; Los Angeles, CA; and Washington, DC).

Research Questions

The study had six research questions. All research questions aimed to examine the relationship of six independent variables with the dependent variable, rate of violent crimes. The intention of this study was to be able to answer the research questions within the context of deterrence theory and economic theory.

Research Question 1: What is the nature of the relationship between the rate of unemployment (as measured by the monthly unemployment rate of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Null Hypothesis 1: There is no statistically significant relationship between the rate of police patrols (as measured by foot patrols, automobile patrols, and bicycle patrols) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 1: There is a statistically significant relationship between the rate of police patrols (as measured by foot patrols, automobile patrols, and bicycle patrols) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 2: What is the nature of the relationship between the rate of unemployment (as measured by the monthly unemployment rate of each city) and

the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010?

Null Hypothesis 2: There is no statistically significant relationship between the rate of unemployment (as measured by the monthly unemployment rate of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 2: There is a statistically significant relationship between the rate of unemployment (as measured by the monthly unemployment rate of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 3: Based on archival data (2000–2010), what is the relationship the between the level of education (as measured by the average number of months a citizen of the city has completed school) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate?

Null Hypothesis 3: There is no statistically significant relationship between the level of education (as measured by the average number of months a citizen of the city has completed school) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 3: There is a statistically significant relationship between the level of education (as measured by the average number of months a citizen of the city has completed school) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 4: What is the relationship between the rate of home ownership (as measured by the monthly home ownership rates of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Null Hypothesis 4: There is no statistically significant relationship between the rate of home ownership (as measured by the monthly home ownership rates of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 4: There is a statistically significant relationship between the rate of home ownership (as measured by the monthly home ownership rates of each city) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 5: What is the relationship between the cost of living (as measured by annual inflation rates) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Null Hypothesis 5: There is no statistically significant relationship between the cost of living (as measured by annual inflation rates) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 5: There is a statistically significant relationship between the cost of living (as measured by annual inflation rates) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Research Question 6: What is the relationship between the rate of unemployment compensation (as measured by the weekly unemployment compensation) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate?

Null Hypothesis 6: There is no statistically significant relationship between the rate of unemployment compensation (as measured by the weekly unemployment compensation) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Alternate Hypothesis 6: There is a statistically significant relationship between the rate of unemployment compensation (as measured by the weekly unemployment compensation) and the rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during the period 2000–2010.

Study Variables

This section details the variables used in this study beginning with the dependent variable and the independent variables. The variables in the study were discrete variables because they were only represented using whole numbers. The discussion includes a brief description of the variable. The following sections specify the dependent and independent variables.

Dependent Variable

I calculated the dependent variable by adding the total number of different offenses involving the use of force. These included murder, robbery, rape, and aggravated assault. Annual data from years 2000 to 2010 were retrieved.

Independent Variables

The independent variables represented the number of police patrols during the 10-year period in terms of (a) foot patrols, (b) automobile patrols, and (c) motorcycle patrols. Annual data from years 2000 to 2010 was retrieved for the variables. These were aggregated.

Unemployment. I measured this by the monthly unemployment rate of each city. Annual data from years 2000 to 2010 were retrieved for the variable. I retrieved the data from the Bureau of Labor Statistics.

Years of education. I measured this by the average number of months a citizen of the city has completed school. I retrieved the data from the BLS. The data were exported into a spreadsheet.

Homeownership. I measured this by the monthly home ownership rates of each city. The data was retrieved from the BLS. The data was exported into a spreadsheet.

Cost of living (inflation rates). I measured this with the monthly cost of living index in a particular city. The cost of living for each month for a given year was averaged so that the index reflected the inflation rates of the economy.

Unemployment compensation. I used the weekly unemployment compensation as the independent variable and year as the controlling variable. The total number of violent crimes was the dependent variable. This data was retrieved from the BLS website and exported to a spreadsheet.

Preliminary Analysis

Data were screened for accuracy, missing data, and outliers or extreme cases. I conducted descriptive statistics and frequency distributions to determine that responses were within the possible range of values and that the data were not distorted by outliers. The presence of univariate outliers was tested by the examination of standardized values for the seven variables of interest: rate of violent crimes (dependent variable) and the six

city characteristics (independent variables). I created standardized values for each score and examined cases for values that fell above 3.29 and below -3.29 (Tabachnick & Fidell, 2012). Cases with missing data were examined for nonrandom patterns. Participants who did not complete major sections of the survey were excluded.

To address Research Questions 1–6, a multiple linear regression determined if the six city characteristics effectively predicted the rate of violent crimes. The dependent variable in this analysis was rate of violent crimes per 100,000 residents in the seven cities examined in aggregate during 2000–2010. Rate of violent crimes was composed from the sum of different violent offenses, including murder, robbery, rape, and aggravated assault; it was treated as a continuous variable. The independent, or predictor, variables in this analysis were number of police patrols, unemployment rates, years of education, home ownership rates, monthly cost of living (inflation), and unemployment compensation rates. Numbers of police patrols were composed from the sum of foot patrols, automobile patrols, and motorcycle patrols, treated as a continuous variable. Unemployment rates came from the monthly unemployment rates of each city, treated as a continuous variable. Years of education came from the average number of months a citizen of the city has completed school, treated as a continuous variable. Home ownership rates came from the monthly home ownership rates of each city, treated as a continuous variable. Monthly cost of living came from the monthly cost of living index in a particular city where the cost of living for each month for a given year was averaged so that the index reflected the inflation rates of the economy; monthly cost of living was

treated as a continuous variable. Last, unemployment compensation rates came from the weekly unemployment compensation rates, treated as a continuous variable.

A multiple linear regression is the appropriate parametric analysis when the goal of the researcher is to assess how much variance can be explained by the influence of a set of independent variables on a continuous dependent variable. This study involved standard multiple regression (the enter method) to address the research questions. The standard method entails entering all independent variables simultaneously into the regression model. Unless theory sufficiently supports the method of entry, the standard multiple regression is the appropriate method of entry. I evaluated the predictors by what they added to the prediction of the dependent variable, which was different from the predictability afforded by the other predictors in the model (Tabachnick & Fidell, 2012). The *F* test assessed whether the set of independent variables (i.e., the six city characteristics) collectively predicted the dependent variable (i.e., rate of violent crimes). I reported the R-squared—the multiple correlation coefficient of determination—used to determine how much variance in the dependent variable can be accounted for or explained by the set of independent variables. The *t* test determined the significance of each predictor and beta coefficients were used to determine the extent of prediction for each of the six city characteristics. For significant predictors, every one-unit increase in the predictor, the rate of violent crimes increased or decreased by the number of unstandardized beta coefficients (Tabachnick & Fidell, 2012). Each of the null

hypotheses can be rejected if the individual predictor provides a statistically significant, unique contribution towards the prediction of rate of violent crimes.

I assessed the assumptions of a multiple regression—normality, linearity, homoscedasticity, and absence of multicollinearity. Linearity is a statistical term that refers to the linear relationship between one variable or a set of variables to another variable or set of variables. Linearity assumes that a straight-line relationship exists between the x-axis (one variable or set of variables) and the y-axis (one variable or set of variables) so that as one variable or set of variables increases in value, the other variable or set of variables increases or decreases in values. Linearity is visually examined in scatter plots. Homoscedasticity is widely known in statistics and means the degree to which the variance for the dependent variable's scores spread across the values for the predictor variables. Values should be spread across all various levels to be considered homoscedastic. Homoscedasticity is visually examined with residual scatter plots (Yang, 2012).

Normality assumes that the scores follow a normal distribution (symmetrical bell shape). Linearity assumes that a straight-line relationship exists between the six city characteristics and rate of violent crimes; homoscedasticity assumes that scores are normally distributed about the regression line (Yang, 2012). I assessed linearity and homoscedasticity by examination of scatter plots. Researchers use multicollinearity when discussing inter-correlations among the predictors in the multiple linear regression. Multicollinearity refers to the extent to which the predictor variables are inter-correlated.

According to Kraha, Turner, Nimon, Zientek, and Henson (2012), multicollinearity is when one or more predictors are highly correlated with one or more other predictors. The higher the multicollinearity, the lower the chance of finding statistical significance from the predictor variables. The absence of multicollinearity assumes that predictor variables are not too related with each other and was assessed using variance inflation factors. Variance inflation factor values higher than 10.0 suggest the presence of multicollinearity (Stevens, 2009). If the aforementioned assumptions are violated, the following nonparametric analysis is conducted: Spearman rho correlations. These correlations are also known as the Spearman rank correlation. The Spearman correlations are used when assessing the association between two variables when at least one of those variables is ordinal or when the assumptions of the parametric Pearson correlations are not met. The Spearman correlation ranks data values from 1 to N (number of pairs of values) instead of using precise values. Like most nonparametric analyses, no assumptions are needed for this test, and the test is less statistically powerful than a parametric analysis.

Ethical Considerations

A researcher who uses human subjects has an ethical responsibility to protect the participants. When conducting this study, I adhered to the ethical and moral guidelines outlined by the Institutional Review Board (IRB). The use of archival data eliminated the necessity to collect identifiable data. In accordance with IRB and federal guidelines, I safeguarded all data to maintain confidentiality. The safeguard method for data storage is a locked file within my residence where the data will be held securely for a period of 5

years after the research is complete. Upon the completion of the 5-year period, I will permanently destroy the data.

Threats to Validity

Key threats to validity corresponded to specifics of the sample that provided a potential bias to the measured results. Confounding variables may have accounted for, or altered the strength of the relationships among the variables of interest (Howell, 2010). Because such variables are infeasible to control for the effect of all potential covariates, I acknowledged this in the interpretation of the findings. As a result, I took additional caution when interpreting the results and did not assume that the findings can be perfectly generalized to the population of interest (Creswell, 2009).

In addition, potential limitations exist within the scope of quantitative research. While quantitative methodologies allow researchers to statistically examine research questions and hypotheses, such researchers are unable to fully measure the underlying experiences and perceptions of the participants. Consequently, I traded the degree of richness present within a qualitative study for a degree of statistical certainty that these differences did not occur by pure chance (Pagano, 2009).

Summary

This chapter detailed the research design and provided a review of the research questions in addition to detailing the population and sampling methodology, the instrumentation and data collection, and the data analysis methodology used for this study. I determined that a quantitative event study was the most appropriate research

design to investigate the relationship between increased police patrol, unemployment rates, unemployment compensation, home ownership, cost of living (inflation), years of education, and violent crime rates. Multiple linear regression was the best method to test the hypotheses. Chapter 4 presents the results of the data analysis to show whether increased police patrols, unemployment rates, unemployment compensation, home ownership, cost of living (inflation), years of education, have a relationship on rates of violent crime in the selected cities. Chapter 5 presents the findings with respect to the relevant literature.

Chapter 4: Results

The purpose of this quantitative study was to determine the nature of the relationship between the independent variables (police patrols, unemployment rate, years of education, home-ownership, cost of living [inflation], unemployment compensation, and the dependent variable (the rate of violent crime) in seven major U.S. cities. The chapter first presents demographical data followed by descriptive statistics of continuous variables. The data analysis involved a multiple linear regression, conducted to assess the research questions. Spearman correlations were used as an ancillary analysis. I evaluated the significance for all analyses at the generally accepted level, $\alpha = .05$.

Description of the Sample

Data collection took about 2 – 3 weeks after approval. Violent crime rates ranged from 0.10 to 0.15, with $M = 0.13$ and $SD = 0.02$. The number of police patrols ranged from 3637.00 to 3837.00, with $M = 3708.00$ and $SD = 71.92$. Unemployment rates ranged from 0.03 to 0.09, with $M = 0.05$ and $SD = 0.02$. Average years of education ranged from 12.05 to 14.10, with $M = 13.17$ and $SD = 0.66$. Home ownership rates ranged from 0.66 to 0.69, with $M = 0.68$ and $SD = 0.01$. Cost of living index ranged from 114.20 to 147.50, with $M = 134.05$ and $SD = 11.66$. Average weekly unemployment compensation ranged from 184.00 to 388.00, with $M = 295.18$ and $SD = 75.32$. Table 1 presents means and standard deviations of continuous variables. Figures 2–8 present bar charts for the six city characteristics by year (2000–2010).

Table 1

Descriptive Statistics of Continuous Variables

City Characteristics	*Min.*	*Max.*	*M*	*SD*
Violent crime rates	0.10	0.15	0.13	0.02
Number of police patrols	3637.00	3837.00	3708.00	71.92
Unemployment rates	0.03	0.09	0.05	0.02
Average years of education	12.05	14.10	13.17	0.66
Home ownership rates	0.66	0.69	0.68	0.01
Cost of living index	114.20	147.50	134.05	11.66
Average weekly unemployment compensation	184.00	388.00	295.18	75.32

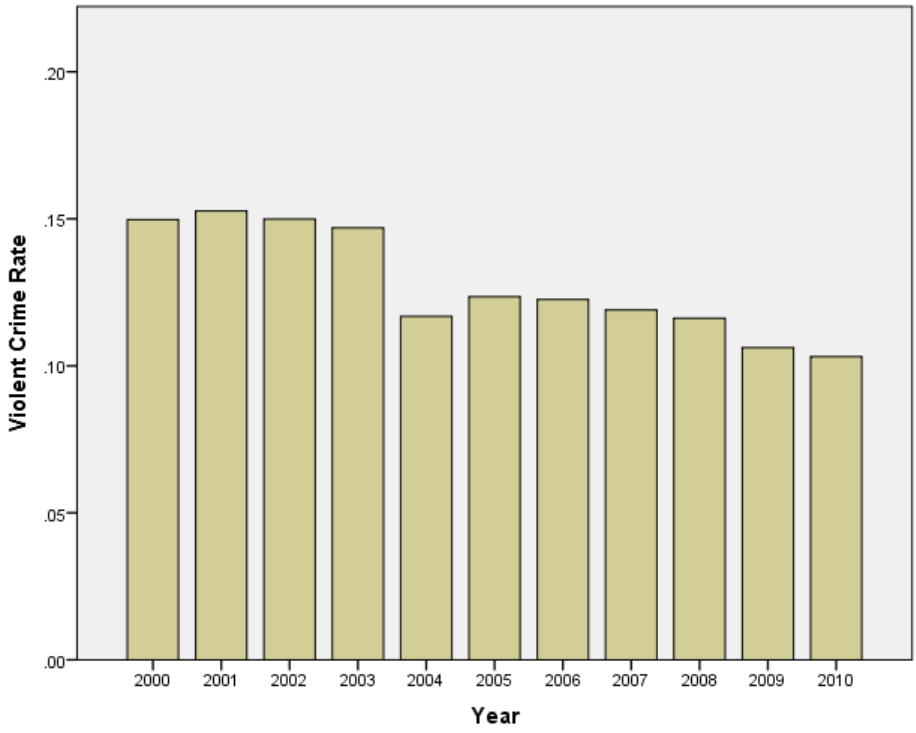

Figure 2. Bar chart for violent crime rates by year (2000–2010).

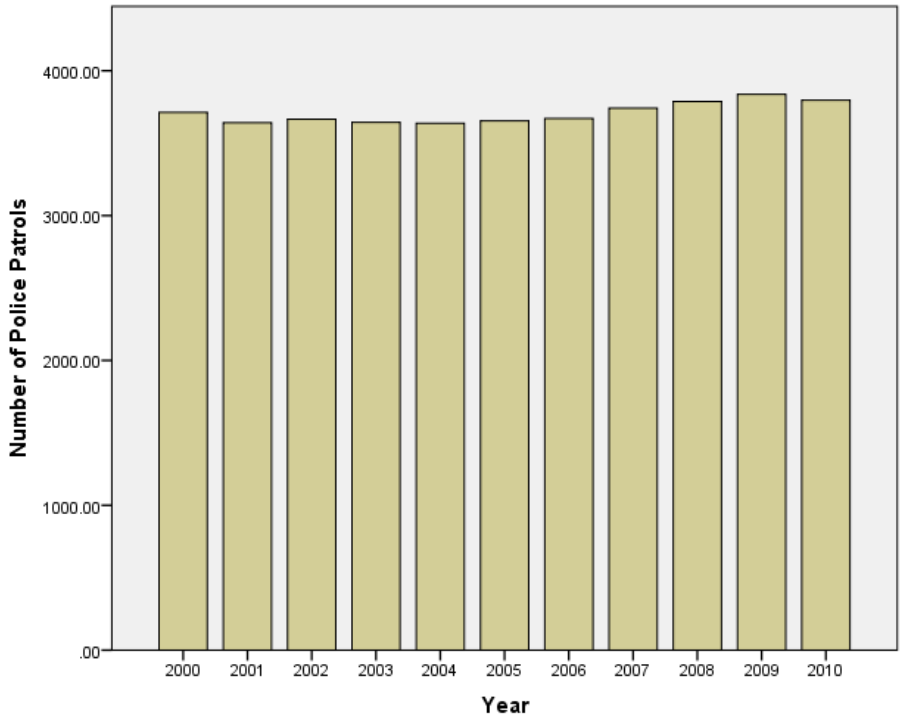

Figure 3. Bar chart for number of police patrols by year (2000–2010).

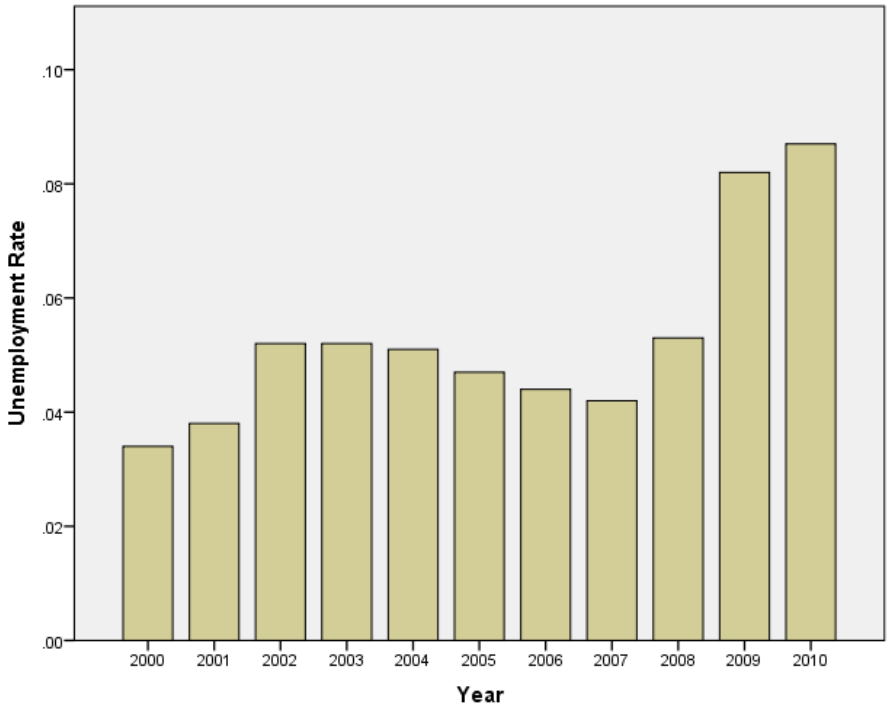

Figure 4. Bar chart for unemployment rate by year (2000–2010).

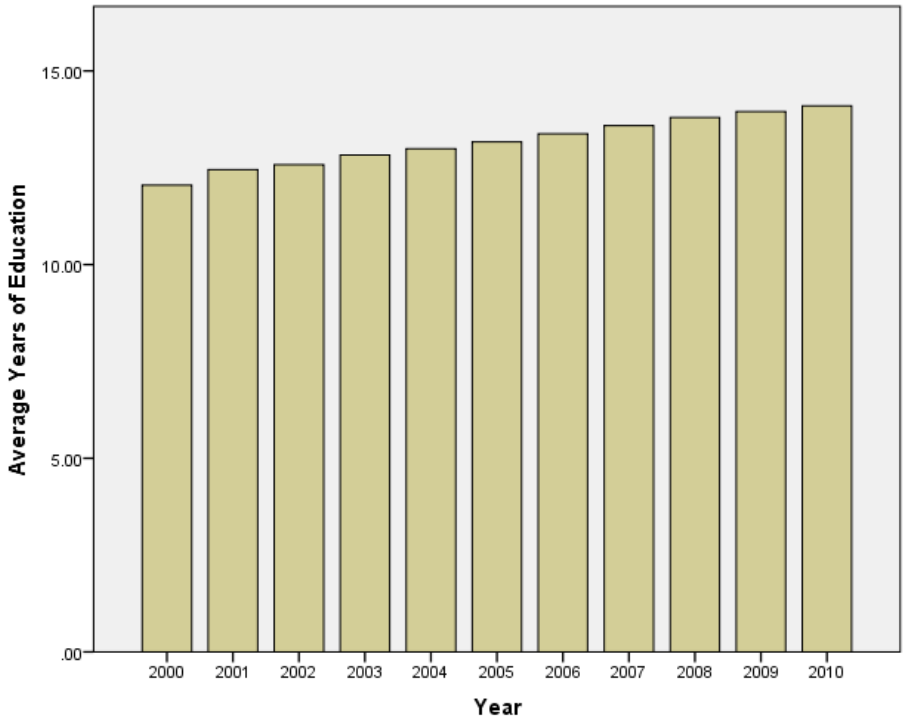

Figure 5. Bar chart for average years of education by year (2000–2010).

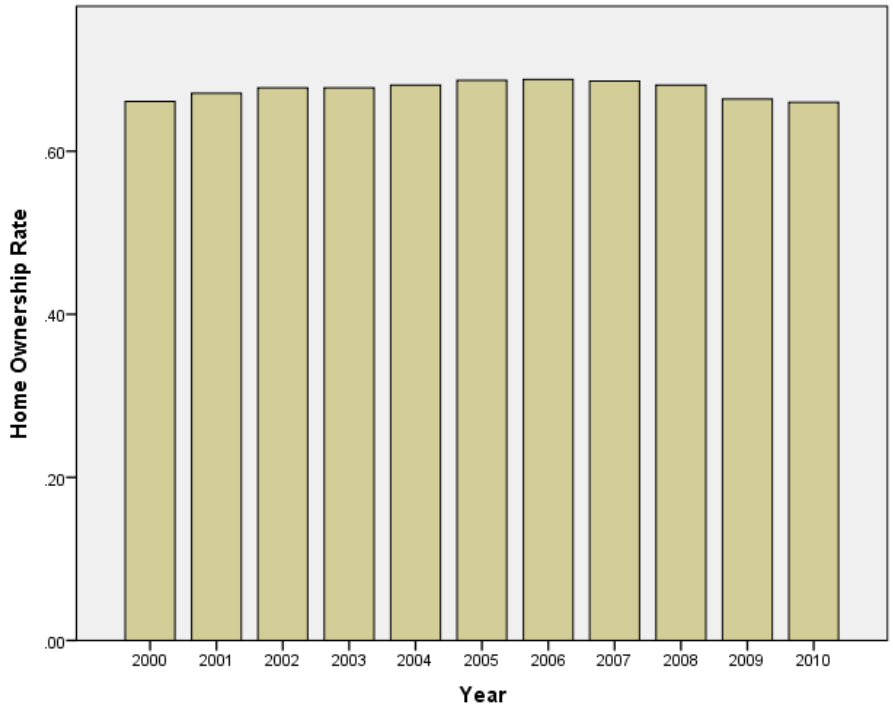

Figure 6. Bar chart for home ownership rates by year (2000–2010).

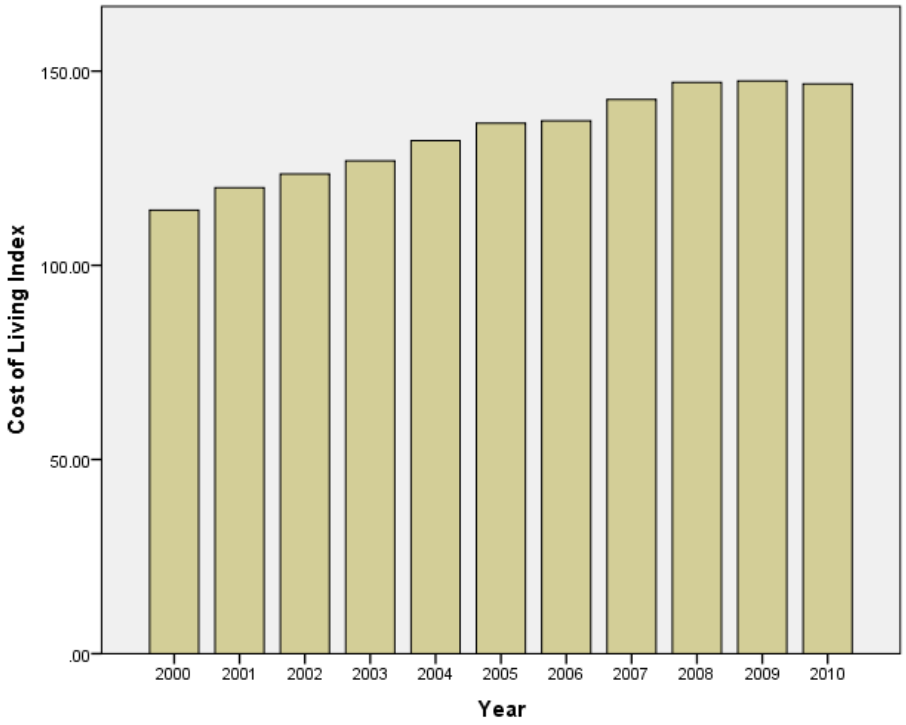

Figure 7. Bar chart for cost of living index by year (2000–2010).

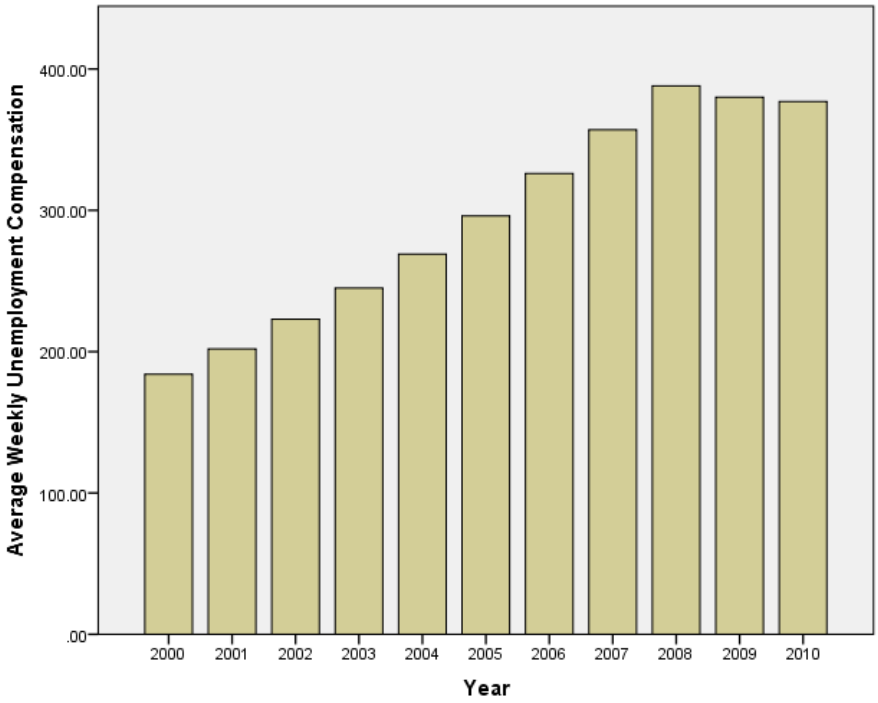

Figure 8. Bar chart for average weekly unemployment compensation by year (2000–2010).

Detailed Analysis

To address the research questions, I conducted a multiple linear regression to determine if the six city characteristics effectively predict the rate of violent crimes. A multiple linear regression is an appropriate statistical analysis when the goal of the researcher is to assess the relationship between a group of predictor variables and a continuous criterion variable (Tabachnick & Fidell, 2012). The predictor variables corresponded to rate of police patrols, rate of unemployment, level of education, rate of home ownership, cost of living (inflation), and unemployment compensation. The criterion variable corresponded to violent crime rate per 100,000 residents. Averages for

each of the variables were computed from seven U.S. cities by year (2000–2010). Prior to analysis, I assessed the assumptions of normality, linearity, homoscedasticity, and absence of multicollinearity.

Normality Assumption

I checked the assumption of normality by examination of a normal P-P lot. The assumption was met, as the data approximately followed the normality line (see Figure 9).

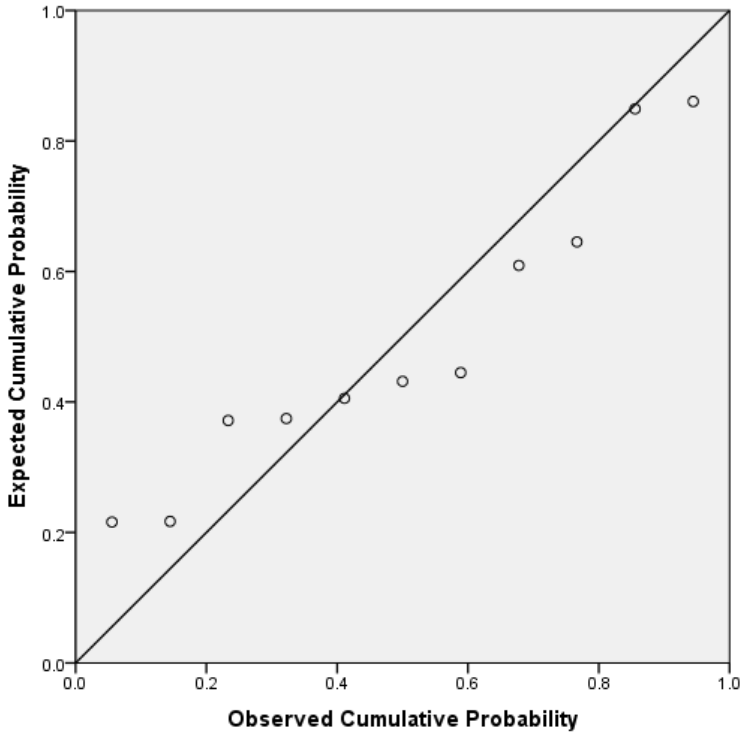

Figure 9. Normal P-P scatterplot to assess normality for city characteristics and violent crime rate.

Linearity Assumption

I assessed the assumption of linearity by examination of six scatterplots between the predictor variables and the criterion variable, violent crime rates per 100,000 residents. The scatterplot between number of police patrols and violent crime rates indicated an inverse relationship (see Figure 10). The scatterplot between unemployment rates and violent crime rates indicated an inverse relationship (see Figure 11). The scatterplot between average years of education and violent crime rates indicated an inverse relationship (see Figure 12). The scatterplot between home ownership rates and violent crime rates indicated an inverse relationship (see Figure 13). The scatterplot between cost of living index and violent crime rates indicated an inverse relationship (see Figure 14). The scatterplot between average weekly unemployment compensation and violent crime rates indicated an inverse relationship (see Figure 15).

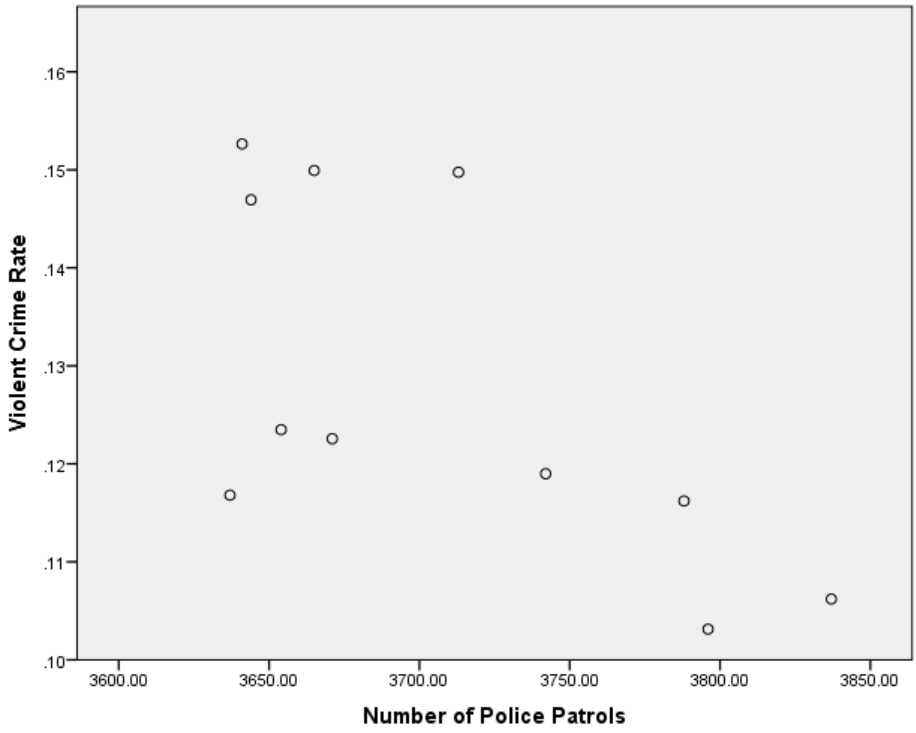

Figure 10. Scatterplot to assess for linearity between number of police patrols and violent crime rate.

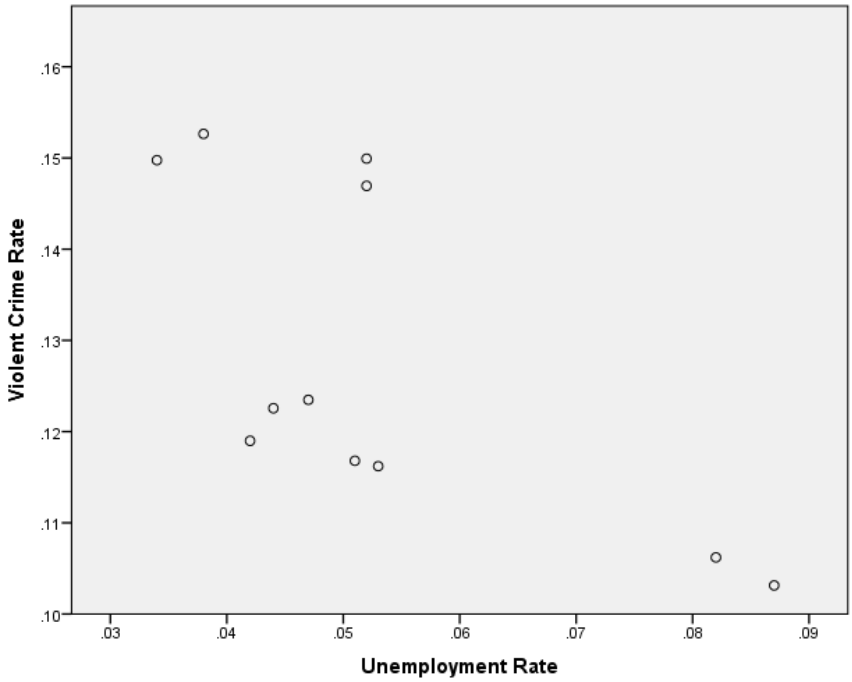

Figure 11. Scatterplot to assess for linearity between unemployment rate and violent crime rate.

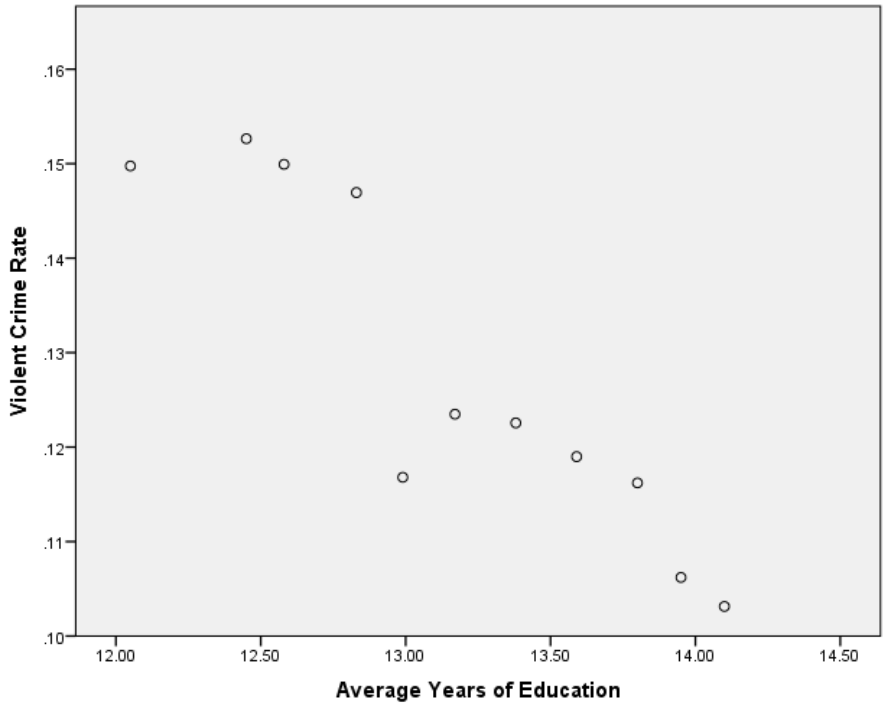

Figure 12. Scatterplot to assess for linearity between average years of education and violent crime rate.

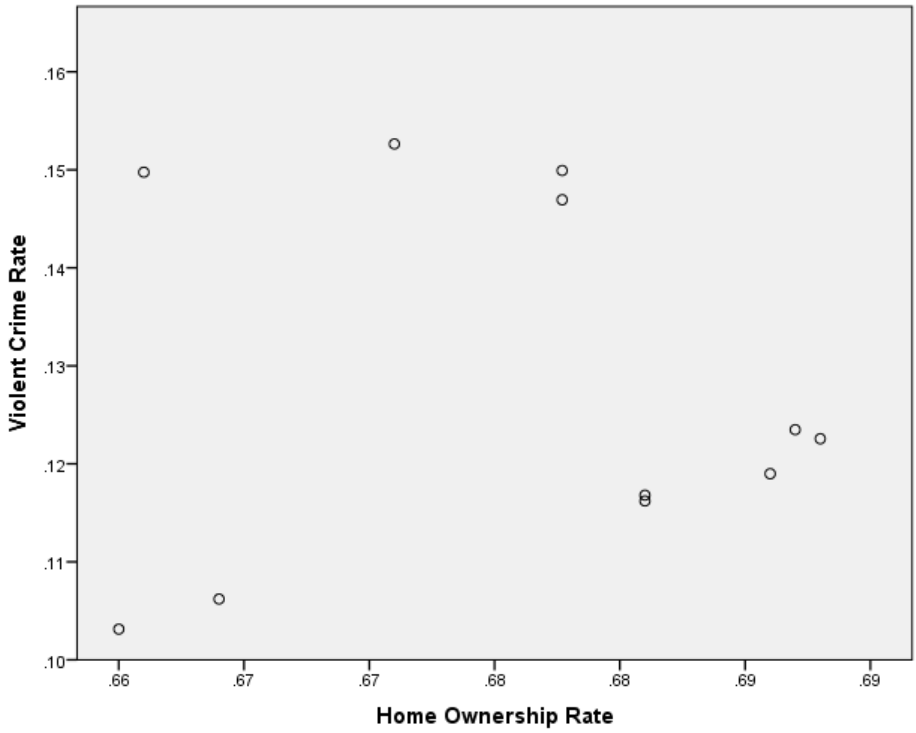

Figure 13. Scatterplot to assess for linearity between home ownership rate and violent crime rates.

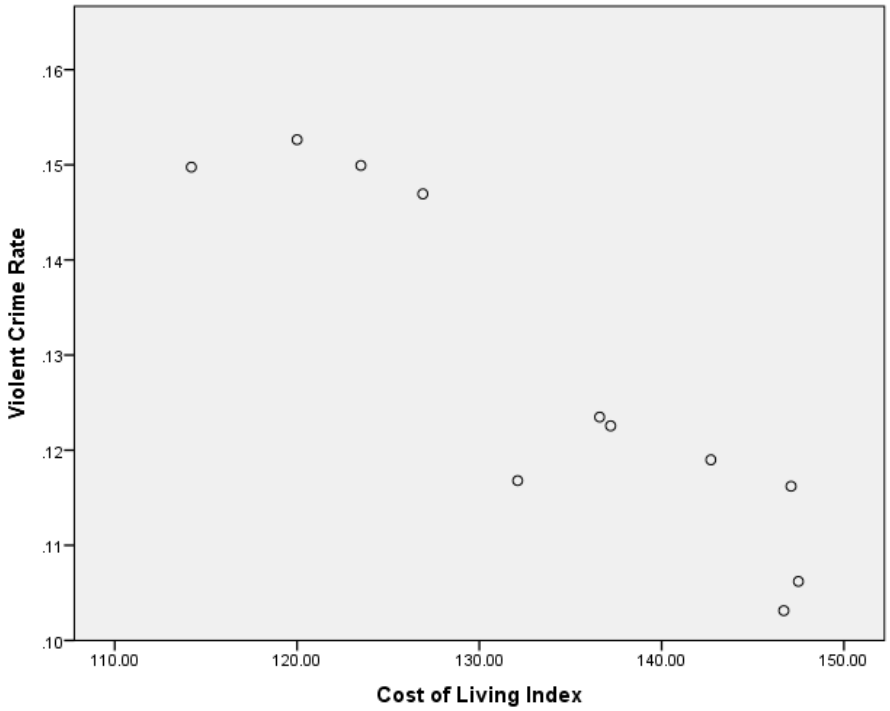

Figure 14. Scatterplot to assess for linearity between cost of living index and violent crime rate.

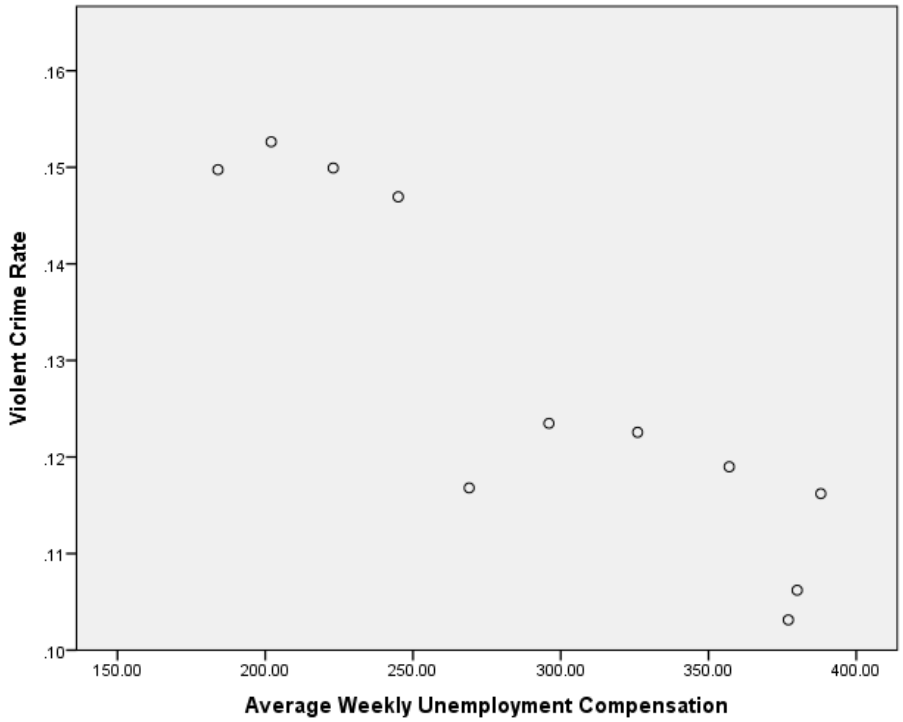

Figure 15. Scatterplot to assess for linearity between average weekly unemployment compensation and violent crime rate.

Homoscedasticity Assumption

I assessed the assumption of homoscedasticity with a residuals scatterplot (see Figure 16). The assumption was met. The data represented a rectangular distribution and no distinguishable pattern existed in the data.

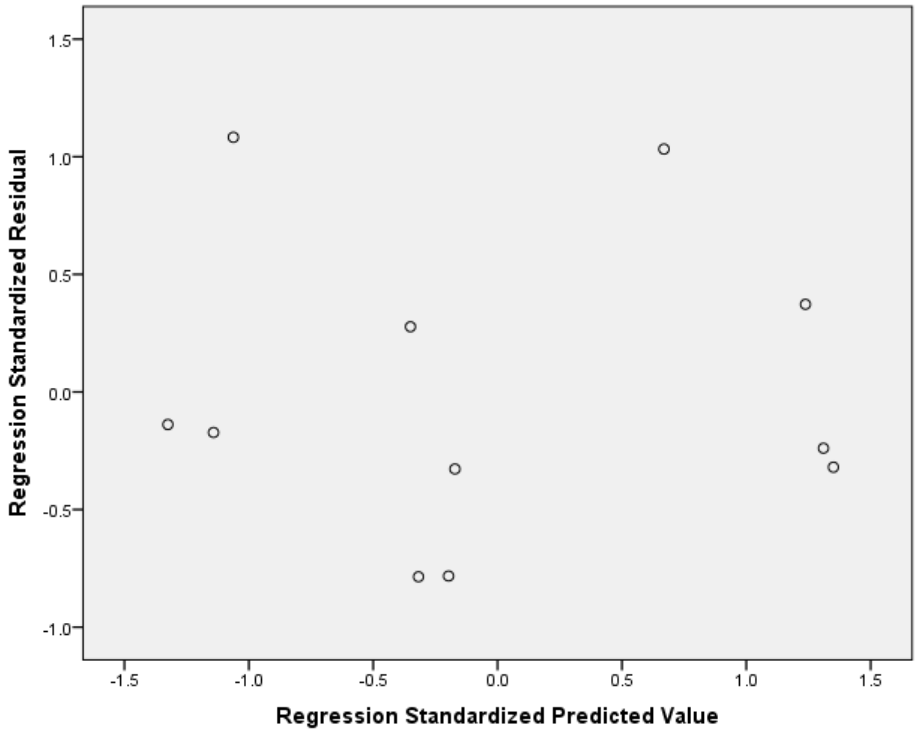

Figure 16. Residuals scatterplot for homoscedasticity for city characteristics predicting violent crime rates.

Absence of Multicollinearity Assumption

The absence of multicollinearity assumption checks that the prediction variables are not too closely associated with one another. This assumption was tested via (VIF), where values larger than 10 indicated the presence of multicollinearity and a violation of the assumption (Stevens, 2009). All of the variance inflation factors values were higher than 10 for the six predictor variables; therefore, the assumptions were not met. I still conducted a multiple linear regression, but also conducted Spearman correlations as an ancillary analysis.

The results of the multiple linear regression were significant, $F(6, 10) = 11.49$, $p = .017$, $R^2 = .945$, suggesting that six city characteristics collectively predict violent crime rates. The R^2 indicates that approximately 95% of the variance in violent crime rates can be explained by the predictor variables. None of the predictors in the model were significant

The number of police patrols was not a significant predictor of violent crime rates ($t = 2.45$, $p = .098$). Therefore, the null hypothesis ($H_0 1$) for Research Question 1 cannot be rejected. Unemployment rate was not a significant predictor of violent crime rates ($t = -0.53$, $p = .626$). Therefore, the null hypothesis ($H_0 2$) for Research Question 2 cannot be rejected. Average years of education were not a significant predictor of violent crime rates ($t = 1.83$, $p = .142$). Therefore, the null hypothesis ($H_0 3$) for Research Question 3 cannot be rejected. Home ownership rates were not a significant predictor of violent crime rates ($t = 2.38$, $p = .076$). Therefore, the null hypothesis ($H_0 4$) for Research Question 4 cannot be rejected. Cost of living index was not a significant predictor of violent crime rates ($t = -1.45$, $p = .222$). Therefore, the null hypothesis ($H_0 5$) for Research Question 5 cannot be rejected. Average weekly unemployment compensation was not a significant predictor of violent crime rates ($t = -1.39$, $p = .237$). Therefore, the null hypothesis ($H_0 6$) for Research Question 6 cannot be rejected. Table 2 presents the results of the linear regression.

Table 2

Multiple Linear Regression with Six City Characteristics Predicting Violent Crime Rates

Source	*B*	*SE*	β	*t*	*p*
Number of police patrols	0.00	0.00	1.47	2.15	.098
Unemployment rate	-0.27	0.51	-0.24	-0.53	.626
Average years of education	0.11	0.06	3.83	1.83	.142
Home ownership rates	1.99	0.84	1.12	2.38	.076
Cost of living index	-0.00	0.00	-2.18	-1.45	.222
Average weekly unemployment compensation	-0.00	0.00	-3.59	-1.39	.237

Note. $F(6, 10) = 11.49$, $p = .017$, $R^2 = 0.95$.

Spearman Correlations

Because of the absence of multicollinearity assumption not being met, I conducted Spearman correlations as an ancillary analysis. A Spearman correlation is an appropriate statistical analysis when the goal of the researcher is to assess the strength of the relationship between two variables, when one or both of the variables are measured on an ordinal scale (Pagano, 2009). Data analysis involved Cohen's standard (Cohen, 1988) to assess the strength of correlation coefficients, where coefficients between .10 and .29 represented a small association, coefficients between .30 and .49 represented a medium association, and coefficients above .50 represented a large association. A significant, large, inverse association existed between number of police patrols and violent crime rates ($r_s = -.64$, $p = .035$). A significant, large, inverse association existed

between unemployment rates and violent crime rates (r_s = -.67, p = .023). A significant, large, inverse association existed between average years of education and violent crime rates (r_s = -.92, p < .001). A significant association did not exist between home ownership rates and violent crime rates though (r_s = .05, p = .883). A significant, large, inverse also relationship existed between cost of living index and violent crime rates (r_s = -.89, p < .001). A significant, large, inverse relationship also existed between average weekly unemployment compensation and violent crime rates (r_s = -.88, p < .001). Table 3 presents the results of the Spearman correlations between the six city characteristics and violent crime rates.

Table 3

Spearman Correlations between Six City Characteristics and Violent Crime Rates

Variable of interest	Violent crime rates	
	r_s	p
Number of police patrols	-.64	.035
Unemployment rate	-.67	.023
Average years of education	-.92	<.001
Home ownership rates	.05	.883
Cost of living index	-.89	<.001
Average weekly unemployment compensation	-.88	<.001

Summary

The purpose of this quantitative study was to determine the nature of the relationship between the independent variables (police patrols, unemployment rate, years of education, home-ownership, cost of living [inflation], and unemployment compensation), and the dependent variable (the rate of violent crime) in seven major U.S. cities. This chapter presented the findings of the data collection. Demographical data were presented first, followed by descriptive statistics of continuous variables.

Results of the multiple linear regression indicated that the six city characteristics were collectively significant in predicting violent crime rates. However, none of the characteristics were significant predictors on their own. Therefore, the null hypotheses

($H_0$1–$H_0$6) for Research Questions 1–6 could not be rejected. I conducted Spearman correlations as an ancillary analysis. Average years of education, cost of living index, and average weekly unemployment compensation had inverse relationships with violent crime rates. In Chapter 5, I further discussed these findings and compared them to existing literature. The chapter outlines how the statistical findings connect back to the theoretical framework. The next chapter also includes suggestions for future research.

Chapter 5: Discussion, Conclusions, and Recommendations

The purpose of this study was to determine the nature of the relationship between the independent variables—police patrols, unemployment rate, years of education, home-ownership, cost of living (inflation), and unemployment compensation—and the dependent variable—the rate of violent crime—in seven major U.S. cities. I tested the hypothesis that a statistically significant relationship existed between each of these independent variables and the dependent variable (rate of violent crime) using both correlational and regression analyses. This study was intended to contribute to the current state of knowledge regarding the historical (2000–2010) relationship between the aforementioned independent variables and the dependent variable in the seven selected cities with high rates of violent crime. The data used were open sourced data retrieved from FBI databases.

Summary of the Findings

Results of the multiple linear regression indicated that the six city characteristics were collectively significant in predicting violent crime rates. However, none of the characteristics were significant predictors on their own. Therefore, the null hypotheses ($H_0$1–$H_0$6) for Research Questions 1–6 could not be rejected. Results of the regression were inconclusive because of violations of the assumptions, absence of multicollinearity and monotonicity (i.e., linear relationship). To calculate interpretable results, I conducted a series of Spearman correlations. The Spearman correlation is not conducted under the

assumption of monotonicity. Because of this, the results could be interpreted with a higher degree of validity.

Based on the findings from the Spearman correlations, average years of education, cost of living index, and average weekly unemployment compensation had significant, large, inverse relationships with violent crime rates. Home ownership rates had no significant relationship with violent crime rates. However, the results showed a significant, large, inverse relationship between five of the six variables, the exception being home ownership rates and violent crime rates.

Interpretation of Findings

The results of a multiple linear regression were significant, $F(6, 10) = 11.49$, $p = .017$, $R^2 = .945$, suggesting that six city characteristics collectively predicted violent crime rates. The R^2 indicated that predictor variables can explain approximately 95% of the variance in violent crime rates. None of the predictors in the model were significant.

A disparity existed between the findings of this study and what other researchers in the peer-reviewed literature asserted regarding increased police patrols not being a predictor of lower violent crime rates (Gault-Sherman, 2012; Kleck & Barnes, 2014; Wain & Ariel, 2014). The findings of this study indicated that (a) unemployment rate was not a significant predictor of violent crime rates, (b) average years of education was not a significant predictor of violent crime rates, (c) home ownership was not a significant predictor of violent crime rates, (d) cost of living was not a significant predictor of violent crime rates, and (e) average weekly unemployment compensation

was not a significant predictor of violent crime rates. A disparity existed between the findings of this study and that of Zimmring (2012) who found root causes (i.e., poverty, racism, etc.) to have no effect on the rate of violent crime. This may be because of differing samples or locations.

Because of the absence of multicollinearity assumption not being met, I conducted Spearman correlations as ancillary analyses. This was appropriate because the goal of the researcher was to assess the strength of the relationship between two variables, when one or both of the variables are measured on an ordinal scale (Pagano, 2009). Cohen's (1988) standard assessed the strength of the correlation coefficients, where coefficients between .10 and .29 represented a small association, coefficients between .30 and .49 represented a medium association, and coefficients above .50 represented a large association. Using this standard, a significant, large, inverse association was found between the number of police patrols and violent crime rates (r_s = -.64, p = .35).

A significant, large, inverse association existed between unemployment rates and violent crime rates (r_s = -.67, p < .023), which differs from the findings of Entorf and Spengler (1998) who found unemployment to have little to no effect on violent crime rates. The large difference between the findings of Entorf and Spengler and this study indicate that future work may be needed to fully understand why this occurred. A significant, large, inverse association existed between average years of education and violent crime rates (r_s = -.92, p < .001). This finding was surprising in that both

Kleemans (2012) and Tauchen et al. (1994) found education to have no effect on violent crime rates. Further research may be needed to explore this disparity and complete the current body of literature regarding this variable.

A significant association did not exist between home ownership rates and violent crime rates (r_s = .05, p = .883). A significant, large, inverse relationship existed between cost of living index and violent crime rates (r_s = -.89, p < .001). A significant, large, inverse relationship also existed between average weekly unemployment compensation and violent crime rates (r_s = -.88, p < .001). In spite of the significant, large, inverse relationship that existed between the five variables and violent crime rates, except for homeownership rates, causation should not be concluded as a result of the relationship because extraneous factors may be contributing to this relationship. The current body of literature did not present the aforementioned variables. As such, more researcher in this field needs to occur in an attempt to thoroughly understand the effect that home ownership rates and average weekly unemployment compensation have on the incidence of violent crime rates.

Limitations of the Study

Although quantitative studies can be useful for statistically analyzing research questions and hypotheses, such studies do not allow researchers to adequately measure the depth of experiences inherent within a qualitative study. In addition, extraneous variables may account for the relationships established in the findings. As such, the statistical findings were interpreted with caution. I focused on establishing the nature of

the relationship between the six independent variables in the study and the dependent variable of violent crime rates, not on causality.

This limitation of a focus on causality was due to the nature of the independent variables, which could not be manipulated. These variables included number of police patrols, unemployment rate, average years of education, home ownership rates, cost of living (inflation), and average weekly unemployment compensation. Not only would it have been unethical to manipulate these variables, but they could not have been feasibly manipulated by one researcher, and so they could not be used in a true experimental study (i.e., a study of causal relationship). The use of a correlational study, which is not useful for determining causal relationships, was the only methodology available to the variables of interest. This limitation will be common to all future studies in this area of research.

When computing averages of the different variables, particular cities appeared to skew the overall mean. For example, Los Angeles had far more law enforcement employees than any of the other six cities. However, the findings of the study could be applicable to other cities in the United States in terms of the correlation between the independent variables and dependent variable of the study. The finding that none of the independent variables on their own were predictors of violent crime rates, but collectively predicted violent crime rates, could also be generalizable for other cities. The use of this study by policy makers in various cities will bring about social change.

Recommendations for Future Studies

Based upon the limitations, I derived several recommendations for future studies from this study:

- While the purpose of the study was to determine the nature of the relationship between the independent variables (police patrols, unemployment rates, years of education, home ownership rates, cost of living [inflation], and unemployment compensation) and the dependent variable (violent crime rates), a causation study could be carried out by other researchers using the results of this study.
- Although some researchers asserted that police patrols had nothing to do with the reduction of violent crime rates, this study demonstrated a significant, large, inverse relationship between them. Future researchers replicating this study may offer further insight on why this disparity occurred.
- In addition, I found the same result for the other variables, except for home ownership rates, which had no significant relationship with violent crime rates. In this regard, it would be useful for other researchers to conduct an integrative study to determine which of the independent variables caused a decrease or increase in violent crime rates.
- Because particular cities appeared to skew the overall mean (i.e., Los Angeles), future researchers should consider studying more cities across the United States or different cities altogether.

- This study did not address displacement of crime; it may be necessary to study displacement to determine whether the data on the count of violent crime would have been different if crime displacement was taken into consideration. Crime in some cases is displaced when hot spot policing is done in a locality, or when saturated police patrols are implemented in a particular area. Because of this, future researchers should also consider the displacement of crime.

Conclusions

Research, if carried out with caution and critical awareness, is the key to solving many everyday problems. Society may hold assumptions that may not be true, but individuals may act on the assumptions, which can have a huge cost. The determination of the drivers of violent crime is necessary because huge expenditures are made without recourse to empirically researched data for guidance in decision-making. Communities have also experienced immense suffering because of violent crime, which may be addressed through previous and current findings on this matter. A break from ideological assumptions on what will solve problems is necessary if people, as a nation, are serious about reducing the incidence of violent crimes in cities. If decisions made to fight violent crime are made from empirical data provided by researchers, social change would have taken place as a result.

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